Profiles of Everyday Thought Suppression

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Profiles of Everyday Thought Suppression

Abstract

The present research assessed whether levels of depression, anxiety and worry, obsessive-compulsive distress, and psychopathy were differentially related to distinct thought suppression profiles. As a means to achieving this goal, the Profiles of Everyday Thought Suppression (PETS) scale was constructed to measure the frequencies with which various target thoughts are suppressed. The PETS scale demonstrated good internal consistency and test-retest reliability, and scores were positively correlated with the general tendency to experience intrusions, the general tendency to suppress thoughts, neuroticism, and health complaints. Although the proportions of time people suppress thoughts was positively associated with the frequencies with which the thoughts are experienced, the strength of the associations differed across thought contents, suggesting that not all frequently experienced thoughts are invariably subject to suppression attempts. The frequency with which thoughts are generally suppressed was positively associated with overall levels of subclinical psychopathology experienced during the past month. When comparing across the various thought categories, results from multiple analytic strategies converged to suggest that specific subclinical psychopathological states are associated with particular sets of thoughts that are frequently suppressed.

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Profiles of Everyday Thought Suppression

Imagine yourself lazing under the sun on a deserted beach, delighting in the crashing of the waves against the shore, all your worries and stresses worlds away. Many of us enjoy reveling in such a blissful thought. Certain thoughts, however, are not quite as relished. Thoughts of your thinning wallet, social blunders, something terrible happening to your loved one, and failing in life all rouse feelings of anxiety and discomfort. Despite their unwelcome presence, these thoughts persistently intrude into our stream of consciousness. When faced with these unwanted thoughts, we might try to push them out of our mind, that is, suppress them.

What are the types of thoughts people try to suppress in everyday life? Can people be distinguished based on the thought contents they typically suppress? Thoughts of shattered relationships and being worthless might plague the minds of those who are depressed while ominous thoughts of a lurking illness and memories of a faux pas, for instance, might taunt those who are highly anxious. Given the significant role thought suppression may play in the etiology and maintenance of various clinical disorders, the goal of this dissertation was to examine whether individual differences in levels of subclinical psychopathology are related to specific sets of thought contents people tend to suppress.

In the following section, the types of thoughts that are likely to be suppressed in the general population are described. Next, the current instruments used to measure the tendency to suppress thoughts are reviewed and then the suppression targets likely to be associated with four main types of psychopathological indicators are discussed. In the

final section of this chapter, the goals of the present research are summarized and an overview of the studies is provided.

Unwanted Thoughts in the General Population

Intuitively, thoughts that we push away are those considered unwanted and/or unacceptable. Further, all things being equal, unwanted thoughts that are experienced more frequently seem more likely to be suppressed. People might perceive recurring unwanted thoughts as persistent, which would prompt more frequent suppression attempts, whereas a rarely occurring thought is less likely to stand out and therefore less likely to be suppressed.

One category of thoughts matching these criteria of being unwanted and recurrent—and therefore likely to be met with suppression efforts—is intrusive thoughts, defined as repetitive thoughts, images, or impulses that are unwanted and/or unacceptable (Rachman, 1978, 1981). Cognitive models of obsessive-compulsive disorder (OCD) ascribing to the dimensional view of OCD symptoms assume that intrusive thoughts are analogues of clinical obsessions; although similar in content, intrusive thoughts and clinical obsessions lie on a severity continuum in that intrusive thoughts are experienced less frequently and less intensely than clinical obsessions (Clark & Rhyno, 2005; cf. Berry & Laskey, 2012). The experience of intrusive thoughts is, nevertheless, a normative phenomenon. Studies have shown that 74-99% of non-clinical participants report having experienced intrusive thoughts such as those related to aggression (e.g., physically or verbally attacking someone), unacceptable sex (e.g., sex in public), health (e.g., being physical ill or diseased), harm befalling loved ones (e.g., harm occurring to spouse or children), and contamination (e.g., dirt in unseen places) (e.g., Edwards &

Dickerson, 1987; Freeston, Ladouceur, Thibodeau, & Gagnon, 1991; Langlois, Freeston, & Ladouceur, 2000; Purdon & Clark, 1993; Rachman & de Silva, 1978; Salkovskis & Harrison, 1984). Indeed, one of the common strategies that non-clinical individuals use in response to intrusive thoughts is an effortful escape/avoidance strategy (e.g., trying to replace the thought with another; using distracters) (Berry & Laskey, 2012; Freeston et al., 1991; Ladouceur et al., 2000), which is a means toward suppressing a thought.

Although most research on intrusive thoughts has focused on the implications of such thoughts for understanding OCD, the phenomenon of intrusive thoughts is not unique to obsessional states. Intrusive thoughts have also been implicated in other emotional states such as anxiety and depression (Clark, 2004). Given the pervasive role intrusive thoughts play in various psychological disorders, one might ask whether all psychological disorders are characterized by a common set of intrusive thoughts or whether the various psychopathological states are associated with specific sets of intrusive thoughts.

Following from the cognitive content-specificity hypothesis (Beck, 1967), which proposes that each psychological disorder is associated with a distinct cognitive profile reflected in the content of a person's cognitions, the various emotional states are likely to be differentially associated with specific contents of intrusive thoughts. The primary theme of depressive cognitions, for instance, is personal loss or failure in interpersonal and achievement domains. Highly depressed individuals are therefore more likely to spontaneously experience self-deprecatory intrusions. In contrast, anxious cognitive content involves potential physical or psychological threat to self or significant others.

People who are highly anxious are therefore more likely to spontaneously report intrusions of something terrible happening to themselves or their loved ones.

In sum, intrusive thoughts are likely targets of frequent suppression in everyday life. For the present research, target thoughts were selected from those gathered in a pilot study in which participants were asked to self-generate thoughts that they frequently suppress as well as from a pool of common intrusive thoughts identified in previous research (e.g., Clark & de Silva, 1985; Purdon & Clark, 1993; Rachman & de Silva, 1978). These thoughts were then used to develop the Profiles of Everyday Thought Suppression (PETS) scale, which was designed to measure the frequency with which various target thoughts are suppressed. The final set of target thoughts included those associated with financial concerns, harm or death, religious guilt, sex, academic or job pressures, aggression, health concerns, social anxiety, physical contamination, lost relationships, eating and weight, family, addictive substances, using technology, accidents, and self-deprecation.

The main goal of the present research was to examine whether levels of subclinical psychopathology were related to particular thought suppression profiles. It was predicted that people could be grouped into distinct clusters based on their response patterns on the PETS scale. These response patterns were assumed to reflect different thought suppression profiles and so each distinct cluster would represent a specific thought suppression profile. It was also predicted that people's membership in a particular cluster would be related to differences in levels of subclinical psychopathology. For instance, one cluster might represent people who suppress thoughts of lost relationships frequently but suppress thoughts of sex infrequently whereas another cluster

might represent people who suppress thoughts of social anxiety as well as thoughts of health concerns often. Based on the cognitive content-specificity hypothesis, people more prone to experiencing depression would be classified into the former cluster more often whereas people more prone to experiencing anxiety would be classified into the latter cluster more often.

The present research was specifically interested in whether subclinical levels of depression, anxiety and worry, obsessive-compulsive distress, and psychopathy were differentially related to particular thought suppression profiles. Before turning to the types of thoughts that are likely associated with these subclinical psychopathologies, the current instruments used to measure the tendency to suppress thoughts are reviewed first. In describing these instruments, a rationale for the construction of the PETS scale is provided.

Assessing the Frequency of Thought Suppression

To measure the frequency with which people suppress thoughts, researchers have often turned to the White Bear Suppression Inventory (WBSI; Wegner & Zanakos, 1994), a self-report questionnaire that includes items such as "There are things I try not to think about." The WBSI was developed with samples of college students and was intended to measure the generalized tendency to use thought suppression as a mental control strategy. This generalized tendency to suppress thoughts was assumed to be consistent across all thought topics and situations. That is, the WBSI does not mention any particular unwanted thought even though people might conceivably differ in the specific unwanted thought they have in mind while filling out the WBSI. Nevertheless, the WBSI has high internal consistency (Cronbach's α range: .87–.89) and good test-retest reliability (*r*s

range: .69–.92) (Muris, Merckelbach, & Horselenberg, 1996; Wegner & Zanakos, 1994). Convergent validity was established with measures of neuroticism, anxiety, depression, obsessional thinking, worry, and intrusive thinking. In addition, high scores on the WBSI were related to an emotional rebound (see Wegner, 1994) as indexed by skin conductance. In sum, the WBSI is considered a valid measure of the general tendency to use thought suppression as a mental control strategy.

Several more recent studies have suggested that the WBSI does not necessarily measure suppression per se. In assessing the WBSI's factor structure, these studies (e.g., Blumberg, 2000; Schmidt et al., 2009) have identified at least two subfactors representing Intrusions (e.g., "I wish I could stop thinking of certain things.") and Suppression (e.g., "There are things I prefer not to think about"). The subfactors were intercorrelated, and although each subfactor was associated with measures of anxiety, depression, and obsessive-compulsive behavior, the Intrusions subfactor correlated better with these measures than did the Suppression subfactor.

Noting that the WBSI focused on items measuring failed suppression and did not include items measuring successful suppression, Rassin (2003) introduced the Thought Suppression Inventory (TSI) as an alternative to the WBSI. The TSI is comprised of three subfactors measuring the general tendency to experience intrusions (Intrusions), attempt thought suppression (Suppression Attempts), and experience successful suppression (Successful Suppression). Similar to the WBSI, the TSI was intended to measure general tendencies and does not mention any particular content of thought. Internal consistency of the Intrusions subscale was moderate (Cronbach's $\alpha = .71$) whereas the internal consistencies of the Suppression Attempts (Cronbach's $\alpha = .64$) and

Successful Suppression (Cronbach's α = .67) subscales were low. Test-retest reliabilities were high for the Intrusions (r = .80) and Successful Suppression (r = .83) subscales but low for the Suppression Attempts (r = .43) subscale. Convergent validity was established for the Intrusions subscale, which correlated with measures of obsessive-compulsive behavior, health complaints, and the use of thought control strategies. In contrast, the Suppression Attempts and Successful Suppression subscales were not correlated with any of these measures.

While the WBSI and TSI differ with respect to the specific constructs they were intended to measure as well as the soundness of their psychometric properties, they are similar in at least one aspect: both do not speak to the particular types of thoughts people suppress. That is, the WBSI and TSI assume that the tendency to suppress thoughts is consistent across a range of thought topics, and so scores on the WBSI and TSI do not reflect whether the extent to which people use suppression differs across thought topics. Although people are likely to differ in the content of their most unwanted thought and therefore differ in the unwanted thought they have in mind while filling out the WBSI and TSI, neither of the two instruments take this difference into account. This calls for the development of an instrument designed to assess the types of thought topics people try to suppress and the frequencies with which they try to suppress these thought topics. Such an instrument would afford the exploration of individual differences in the tendency to suppress a variety of thoughts.

In particular, the present research was concerned with examining whether people can be separated into distinct groups based on their thought suppression profiles, and whether levels of various psychopathological indicators were differentially related to

group membership. Given that thought suppression has been implicated in the etiology and maintenance of certain psychopathologies such as generalized anxiety disorder, depression, and OCD (Najmi & Wegner, 2008; Purdon, 1999), it would be very useful to establish whether various forms of psychopathology might each have their own characteristic set of self-reported suppression targets. These characteristics sets of suppression targets would potentially shed light on the differential diagnosis of clinical disorders. The next section surveys four main psychopathological indicators (depression, anxiety and worry, obsessive-compulsive distress, and psychopathy) and discusses how each of these indicators might be associated with specific sets of suppression targets.

Subclinical-Specific Unwanted Thoughts

The issue of whether psychopathologies should be classified categorically (i.e., each disorder is a distinct clinical entity) or dimensionally (e.g., anxious and depressive disorders represent a single underlying mood dimension) is a longstanding debate (cf. Widiger & Mullins-Sweatt, 2009; Widiger & Shea, 1991). The categorical approach was developed from Kraepelinian concepts, which emphasized the classification of disorders on the basis of clinical symptomatology, course, and outcome. While the categorical approach facilitates communication among clinicians, provides a neat framework for guiding differential treatment, and has fueled much research aimed at identifying the etiologies and mechanisms involved in these putatively distinct psychopathologies, the validity of the categories have been questioned due to high rates of comorbidity and heterogeneity within categories. Consequently, a dimensional approach has been proposed as an alternative where clinical disorders are conceptualized along multiple dimensions rather than as unique constellations of symptoms.

While a more extended discussion of this debate can be found elsewhere (see Krueger, Watson, & Barlow, 2005), the present research follows the dimensional approach to psychopathology and assumes that clinical symptoms are extreme variants of normal-range symptoms. A series of scales were used to assess subclinical symptoms, that is, symptoms reflecting a proneness to clinical disorders. Since these scales are not sufficient for a full diagnosis of a clinical disorder—a full diagnosis would require further evidence regarding the nature, severity, and duration of symptoms as well as many other complicating factors such as comorbidity—they represent measures of psychopathological indicators as opposed to psychopathologies per se. This research therefore serves as an initial survey of the relationship between the scales researchers have often used to identify people who are prone to clinical disorders and the specific content of unwanted thoughts.

How might each of these psychopathological indicators be differentially associated with specific thought suppression profiles? On the basis of the cognitive theory of emotional disorders (Beck, 1976), it was expected that the unwanted thoughts people often suppress would be a subset of the thought contents characteristic of the predominant emotional state. The cognitive theory of emotional disorders posits that every psychological disorder has a specific cognitive profile reflected in the automatic thoughts associated with the disorder. Automatic thoughts are assumed to be cognitive products of a person's enduring, latent cognitive schemas. They therefore occur spontaneously and dominate the person's stream of consciousness. The idiosyncratic cognitive schemas also result in specific emotional states, which are said to be concomitants of and thus positively related to the person's particular set of automatic

thoughts (Clark & Steer, 1996). Each psychological disorder is therefore characterized by distinct cognitive contents, and the specific cognitive contents are considered to be critical for the differential diagnosis of clinical disorders.

If particular cognitive contents are associated with specific psychopathological states and if people often use suppression as a means to cope with their intrusive thoughts (Najmi & Wegner, 2009), this suggests a specific relationship between individual differences in levels of subclinical psychopathology and the types of thoughts people report suppressing often. Different psychopathological states might be related to distinct sets of intrusive thoughts and thus distinct thought suppression profiles. Although frequently experienced thoughts are more likely to be suppressed, it is, nevertheless, not clear whether all intrusions are invariably suppressed. In other words, while a fair degree of overlap is expected between the types of thoughts people often experience and the types of thoughts people often suppress, it is not necessarily the case that all types of frequently experienced intrusions are always subject to suppression attempts.

Here, it is also important to note that automatic thoughts have been distinguished from intrusive thoughts (Clark & Purdon, 1995; Clark & Rhyno, 2005; Salkovskis, 1985). Compared to intrusive thoughts, automatic thoughts are considered to be more ego-syntonic, less irrational, and less disruptive. In contrast, intrusive thoughts are more likely to interfere with ongoing cognitive activity and redirect thinking whereas automatic thoughts run parallel to conscious awareness. Despite their differences, Salkovskis proposed a functional relationship between intrusive thoughts and automatic thoughts in that intrusive thoughts activate the latent cognitive schemas, which then trigger bouts of negative automatic thinking and mood disturbances. This functional

relationship therefore suggests a strong overlap between the contents of intrusive thoughts and the contents of automatic thoughts associated with a particular psychological state.

In sum, it was hypothesized that people could be grouped into distinct clusters based on their thought suppression profiles and that particular suppression-profile clusters would be differentially associated with various psychopathological tendencies and states. That is, a particular suppression-profile cluster would be more strongly associated with one psychopathological indicator than another. Below, for each of the four main psychopathological indicators assessed in the present research, the suppression targets most likely associated with a specific psychopathological indicator are identified. In general, it was predicted that the characteristic set of intrusive thoughts associated with each psychopathological indicator would be the most likely candidates of suppression.

Depression. The attitudes and beliefs characteristic of depression involve a negative view of self and world. Depressive cognitions take the form of global, absolute statements about past personal losses in interpersonal and achievement domains, and reflect an overwhelming sense of failure and hopelessness (Beck, 1976). Studies have consistently found a specific relationship between depressive symptoms and thoughts of loss and failure in both clinical and nonclinical samples, although the degree of specificity might vary with severity of psychopathology (Clark, Beck, & Alford, 1999; Clark & Steer, 1996). Therefore, suppression targets most likely associated with high levels of depression should concern those related to financial concerns, lost relationships, and self-deprecation. Although clinical depression has been associated with a reduction in sexual interest and function (Beck, 1976; Kennedy, Dickens, Eisfeld, & Bagby,

1999)—which would suggest that people with high levels of depression would be less likely to experience and thus suppress thoughts of sex—some studies have found that a small number of participants report greater sexual desire when feeling depressed (e.g., Frohlich & Meston, 2002; Lykins, Janssen, & Graham, 2006). Further, evidence is mixed on whether these symptoms are uniquely related to depression (cf. P. F. Lovibond & S. H. Lovibond, 1995). Thus, people scoring high on depressive symptoms might suppress thoughts of sex either infrequently or frequently.

Anxiety and worry. Anxious cognitive content involves anticipatory physical or psychological harm to self or significant others (Beck & Emery, 2005). In contrast to depression, results for the specificity of the relationship between anxious symptoms and thoughts of potential danger have not been consistent (Clark & Steer, 1996). One conjecture is that cognitive assessments of anxiety might be too general in that they gauge symptoms pertaining to a wide range of anxiety disorders such as generalized anxiety, social phobia, and panic (Beck & Perkins, 2001). Instead of the broad, heterogeneous construct of anxiety being related to a generic set of intrusive thoughts, particular clusters of anxious symptoms might be related to specific subsets of intrusive thoughts. For instance, Woody, Taylor, McLean, and Koch (1998) found better support for the cognitive content-specificity hypothesis when anxious symptoms were subdivided into those related to worry (e.g., I'm afraid we won't have enough money), panic (e.g., I am going to be trapped), somatic preoccupation (e.g., I'm worried about my health), and social fears (e.g., I am going to be embarrassed). In the present research, two measures were used to gauge levels of anxiety: a global measure combining situational anxiety, autonomic arousal, and subjective experience of anxious affect versus a specific measure

of trait worry. In relation to the target thoughts used in the present research, suppression targets most likely associated with the global measure of anxiety and the trait measure of worry should concern those related to financial concerns, harm or death, academic or job pressures, health concerns, social anxiety, and accidents.

Obsessive-compulsive distress. Obsessive cognitive content involves unrealistic appraisals of the harmfulness of one's thoughts, the importance of controlling one's thoughts, and personal responsibility for damage or harm befalling others (Clark et al., 1999; Salkovskis, 1985). While most research on the cognitive content-specificity hypothesis has focused on anxiety and depression, the specific cognitive profile of obsessive thinking has been established in several studies (e.g., Salkovskis et al., 2000). Given that one of the automatic cognitions characteristic of individuals high on obsessive thinking is the importance of mental control, it is likely that these individuals would exhibit a tendency to suppress all thoughts to a greater extent. In other words, one of the suppression-profiles might represent people who have a high tendency to suppress all thoughts in general. Nevertheless, among these target thoughts, certain targets might be suppressed particularly frequently. Given that thoughts related to harm, unacceptable sex, aggression, and accidents are regarded as the most upsetting and frequent intrusive thoughts in nonclinical individuals (Berry & Laskey, 2012), suppression targets most likely associated with high levels of obsessive thinking should concern those related to harm or death, sex, aggression, and accidents. Interestingly, intrusive thoughts about disease and contamination in comparison were found to be less upsetting and less frequent in nonclinical samples, although this has been attributed to an artifact of the young age of samples. Religious guilt might also be a prime candidate for suppression,

although this is likely to depend on the religiosity levels of the particular sample. Even though the frequency of thought suppression was expected to be more strongly related to obsessive thinking than with compulsions, a global measure of obsessive-compulsive distress was used to allow for greater variability in the scores. Previous research (e.g., Wegner & Zanakos, 1994), nonetheless, has demonstrated that thought suppression is broadly related to several manifestations of obsessions and compulsions.

Psychopathy. Subclinical psychopathy is characterized by interpersonal manipulation, antisocial tendencies, shallow affect, low empathy, remorselessness, high impulsivity, and stimulation-seeking (Hare, 1999; Hare & Neumann, 2008). Unlike the previous psychopathological indicators, which each have been associated with idiosyncratic cognitive content, psychopathy primarily involves an abnormal cognitive *process* (i.e., information-processing deficiency) as opposed to abnormal cognitive *contents* (Wallace & Newman, 2004). That is, psychopaths demonstrate a deficit in allocating attention to information important for the controlled regulation of goal-directed behavior. This inability to evaluate the appropriateness of behaviors and responses contributes to the impulsive and antisocial nature of psychopaths. Although antisocial tendencies—which constitute one of the latent factors in the four-factor model of psychopathy (Hare, 2003)—have been typified by dysfunctional, self-serving schemas such as "the views of others are irrelevant to my decisions, unless they directly control my immediate consequences" (Beck, Freeman, & Davis, 2006), not all psychopaths exhibit these antisocial beliefs. Therefore, in contrast to the other psychopathological indicators, psychopathy is less likely to be associated with the suppression of specific thought contents. Nevertheless, high levels of psychopathy were hypothesized to be

associated with a low tendency to suppress all thoughts in general. First, given that high levels of psychopathy are associated with low levels of neuroticism (Paulhus & Williams, 2002) and that neuroticism is positively correlated with the tendency to suppress thoughts (Erskine, Kvavilashvili, & Kornbrot, 2007), high levels of psychopathy are likely associated with a low tendency to suppress thoughts. Second, individuals with higher psychopathic tendencies have been found to report a lower number of intrusive thoughts (O'Neill, Nenzel, & Caldwell, 2009). This was assumed to reflect that such individuals were less likely to perceive intrusive thoughts as "intrusive" and more likely to perceive them as ego-syntonic, suggesting that individuals with higher psychopathic tendencies would be less motivated to suppress any thoughts. Therefore, since the construct of psychopathy diverges from the other psychopathological indicators in that it has not been classically defined in terms of particular unwanted thoughts, the construct of psychopathy was examined primarily as a means to assess the discriminant validity of the PETS scale.

In sum, it was predicted that people could be grouped into distinct clusters based on their characteristic thought suppression profiles. These distinct clusters would then be differentially associated with levels of depression, anxiety, obsessive-compulsive distress, and psychopathy.

The Present Research

The ultimate goal of the present research was to assess whether levels of subclinical psychopathology were related to distinct thought suppression profiles. As a means to achieving this goal, the types of target thoughts people try to suppress in everyday life were first identified and then the PETS scale was constructed to measure the frequencies with which these various target thoughts are suppressed. In addition, the

relationship between how often people *experience* each of the target thoughts and the proportion of time these thoughts are suppressed was examined. The purpose was to assess whether all thoughts that are frequently experienced are invariably suppressed, and more importantly, whether people simply used their rating of how often they experienced a thought as a proxy for their rating of how often they suppress the thought. The latter, which would be reflected in identical response patterns for both ratings, would undermine the validity of the PETS scale.

To allow for generalizability of the findings to a relatively broad population, the majority of participants in the present research were recruited from Amazon's Mechanical Turk (MTurk; http://www.mturk.com), a popular online crowdsourcing platform. On MTurk, users who register as "Requesters" (i.e., task creators) create and distribute "Human Intelligence Tasks" (HITs) to users who register as "Workers." Workers are paid on successful completion of HITs. The HITs can range from simple surveys to complex behavioral experiments. In 2010, MTurk reported a subject pool consisting of 500,000 Workers from over 190 countries worldwide (Amazon Web Services, 2011). Compared to the typical American college samples, MTurk Workers are more demographically diverse (Buhrmester, Kwang, & Gosling, 2011). In addition, since the existing pool of MTurk workers remains relatively stable over time (Mason & Suri, 2012), data are less affected by the seasonality of the academic semester, where peak recruitment periods usually occur during the beginning and end of the semester.

Overview of Studies

A series of three main studies were carried out. A pilot study was initially conducted to gather a list of participant-generated suppression targets. Based on this list,

a first version of the PETS scale was constructed in Study 1a. In Study 1b, a second iteration of the PETS scale was administered and after further refinement of the item list, a final PETS scale was developed. The generalizability of the scale's factor structure and its temporal stability were evaluated in Study 1c and 1d, respectively. In Study 1e, the validity of the PETS scale was assessed. Specifically, constructs expected to be highly correlated with the scale (e.g., the general tendency to suppress thoughts, neuroticism, health complaints) and those not expected to be strongly correlated with the scale (e.g., openness, extraversion) were used to gauge the scale's convergent and discriminant validity, respectively. Study 2 gathered information about how often people experience each of the target thoughts listed in the PETS scale as well as the proportion of time people suppress each thought. Finally, Study 3 assessed the relationship between thought suppression profiles and individual differences in subclinical levels of depression, anxiety and worry, obsessive-compulsive distress, and psychopathy.

Pilot Study: Constructing the PETS Scale Item Pool

An initial sample of items was gathered through a pilot study in which participants recruited through MTurk were asked to generate a list of target thoughts they often try not to think about.

Participants

The sample of MTurk Workers consisted of 56 individuals (39 female, 17 male). Workers were compensated with $0.20 on successful completion of the HIT. Mean age of participants was 31.8 years (*SD* = 10.8; range: 19–65). Racial composition of the sample was 66.1% White, 16.0% Asian or Asian American, 7.1% African American, 3.6% Native American, 1.8% Hispanic, and 5.4% Multiracial. All participants were from the United States.

Procedure and Measures

The study was hosted on Qualtrics (http://www.qualtrics.com), an online survey website. After providing informed consent and demographic information, participants were prompted to generate a list of thoughts they often try to suppress. Specifically, participants first read the following:

> *Sometimes, the first thought people have when they wake up in the morning is the very thing they try not to think about. Describe such a thought you've experienced. Please be as specific as possible in your description.*

Next, participants were presented with the following prompt:

> *Describe at least five other thoughts you often try not to think about. If applicable, include when and where you typically experience these unwanted thoughts. Please be as specific as possible in your description.*

Participants were then thanked and debriefed.

Results and Discussion

The target thoughts participants provided included the following themes (examples and frequency of mentions in parentheses): academic or job pressures (*upcoming exam*, *work deadlines*; *n* = 31); financial concerns (*bills*, *student loans*; *n* = 29); death (*own mortality*, *death of a loved one*; *n* = 25); relationship concerns (*ex-partners*, *spouse cheating*; *n* = 19); family problems (*parent's divorce*; *n* = 13); health concerns (*getting cancer*, *becoming seriously ill*; *n* = 7); personal image or weight (*appearance*, *going to the gym*; *n* = 7); aggression (*anger toward someone*; *cursing*; *n* = 6); worries about the future (*uncertain future*; *n* = 5); social anxiety (*embarrassing moments*; *n* = 3); physical contamination (*hygiene matters*, *gory pictures*; *n* = 2); accidents (*getting into an automobile accident*; *n* = 1); sexual thoughts (*sexual attraction toward others*; *n* = 1); and addictions (*alcohol cravings*; *n* = 1). Based on these participant-generated thoughts, a list of 107 thought items encompassing a broad range of topics was constructed with each topic being comprised of at least three thought items (see Appendix A). This 107-item PETS scale was empirically refined in the next study.

Study 1a: Developing the PETS Scale

The 107 items generated in the first phase of the study served as the basis for the first version of the PETS scale. This scale was administered to a sample of MTurk Workers who were asked to rate the frequency with which they suppressed each thought. Since there were no a priori theories or hypotheses about the nature of the underlying structure, the 107-item PETS scale ratings were subjected to a principal-components analysis to find an optimal way of grouping the target thoughts into smaller subsets. In addition to the 107-item PETS scale, participants were given the opportunity to provide any thoughts that were not already included in the scale. Based on the results, a second version of the PETS scale was developed (see Study 1b).

Participants

The sample of MTurk Workers consisted of 803 individuals. Workers were compensated with $0.85 on successful completion of the HIT. At the end of the survey, an Instructional Manipulation Check (IMC; Oppenheimer, Meyvis, & Davidenko, 2009) was used to distinguish individuals who were actually paying attention to the study stimuli from those who were skimming instructions and missing key elements of the task. Individuals who did not respond correctly or who did not respond at all to the IMC (9%) were excluded. There were no significant differences between those included versus excluded on age, sex, or race. Mean age of the final sample (N = 731; 350 female, 376 male, 5 not reporting sex) was 30.3 years (SD = 10.6; range: 18–71). Of participants who indicated race, 79.5% were White, 7.2% Asian or Asian American, 4.0% African American, 2.2% Hispanic, 0.3% Native American, 6.6% Multiracial, and 0.3% self-classified as Other. All participants were from the United States.

Due to the Institutional Review Board's concerns with confidentiality, MTurk Worker IDs could not be matched with responses. Therefore, it could not be ascertained which of the MTurk Workers were excluded from analyses. Nevertheless, the samples from the pilot study and Study 1a were largely independent; 8 of those who participated in the pilot study had also participated in Study 1a.

Procedure

The study was hosted on Qualtrics. After providing informed consent and demographic information, participants completed the 107-item PETS scale. They were also given the opportunity to list any thoughts that were not included in the 107-item PETS scale. Participants then responded to an IMC, were thanked, and debriefed.

Measures

107-item PETS scale. The 107-item PETS scale (see Appendix A) began with the following prompt: "Sometimes people try not to think about things. How often do you TRY NOT to think about each of the following?" Participants indicated, using a 5-point scale (*never try not to think about*, *once or twice try not to think about*, *occasionally try not to think about*, *frequently try not to think about*, *constantly try not to think about*), how often they try not to think about each of the target thoughts. The order of all items was randomized for each participant.

Participant-generated target thoughts. Participants were given the opportunity to generate any target thoughts they often try not to think about. They were asked, "Is there an unwanted thought you constantly try not to think about that wasn't included in the list of thoughts you rated?"

Instructional Manipulation Check. The Instructional Manipulation Check (IMC; Oppenheimer et al., 2009) was used to distinguish individuals who were actually paying attention to the study stimuli from those who were skimming instructions and missing key elements of the task. Participants were presented with the following prompt:

> *Research in decision making shows that people, when making decisions and answering questions, prefer not to pay attention and minimize their effort as much as possible. Some studies show that over 50% of people don't carefully read questions. If you are reading this question and have read all the other questions, please select the response option 'Other' and type 'I read the instructions' in the box below. Do not select "thoughts you try not to think about." Thank you for participating and taking the time to read through the questions carefully!*
>
> *What was this study about?*

The response options included: *Thoughts you try not to think about*, *Your thoughts and moods*, *Your moods*, and *Other*.

Results and Discussion

Ratings for all 107 PETS scale items had an acceptable amount of variance (responses for all items spanned the entire range from *never try not to think about* to *constantly try not to think about*). Although the distribution of some items was positively

skewed, this was expected given that the items are discrete variables. All items were retained for analysis.

Responses on the 107-item PETS scale were subjected to a principal-components analysis with varimax rotation. Next, responses to the question asking participants whether there were other target thoughts not included in the 107-item PETS scale were examined. Items for the second version of the PETS scale were selected based on the results of the principal-components analysis as well as the list of participant-generated target thoughts.

Principal-components analysis. A principal-components analysis of the 107-item PETS scale responses with varimax rotation yielded a 19-factor solution (all initial eigenvalues > 1) accounting for 66% of the variance.

Fifteen of the factors could be interpreted relatively easily (see Appendix B). They included thoughts about: financial concerns (*running out of money*); self-deprecation (*not knowing what to do with my life*); harm or death (*the possible death of a loved one*); religious guilt (*God judging me*); sex (*being sexually attracted to someone*); academic or job pressures (*difficulties at work or school*); aggression (*hitting others*); health concerns (*my health problems*); social anxiety (*feeling nervous around others*); moral or physical contamination (*sexual images of religious figures*; *images of spiders or cockroaches*); hurting or harming others (*things I've said or done to hurt someone*); lost relationships (*my ex-boyfriend or ex-girlfriend*); eating and weight (*eating snacks*); family (*my father*); and addictive substances (*smoking a cigarette*). Each factor had between 3–14 items.

Three other factors either had only one or two items that loaded on it or were more specific variants of another existing factor. For instance, *checking my e-mail* was the only item that loaded on one factor; *questioning God's existence* and *questioning my belief in God* comprised another factor; and items that were related to harm or death befalling oneself specifically comprised another factor. For the final factor, items that loaded positively were broadly related to accidents (*leaving the gas stove on*; *getting into a car accident*). There were, however, also high negative loadings of seemingly unrelated items (e.g., *chores I need to do around the house*).

Items that had primary loadings > .40 were retained for the second version of the PETS scale. To ensure that each of the factors had a relatively equal number of items, new items were added and repetitive items were removed so that each factor had between three to five items. Item addition and deletion were guided by the list of new items participants provided when asked if there were other frequently suppressed target thoughts that were not already included in the 107-item PETS scale, the results of which are described next.

Participant-generated target thoughts. When participants were asked whether there were other frequently suppressed target thoughts that were not already included in the 107-item PETS scale, 50.9% responded that the list was comprehensive and/or they had nothing to add, and 20.9% provided an item that was already included in the list (i.e., a more specific variant of an existing item). Of those who provided a new item, 23.6% generated a new item not on the list and 4.7% provided an item that was vaguely defined (e.g., "the universe," "specific memory").

In general, the categories of thoughts included in the 107-item PETS scale encompassed a good range of thoughts that people typically suppress. As mentioned, the new thoughts participants provided were used to guide item addition and deletion for the second version of the PETS scale. This version consisted of 78 target thoughts grouped under the following 16 categories: financial concerns; self-deprecation; harm or death; religious guilt; sex; academic or job pressures; aggression; health concerns; social anxiety; physical contamination; hurting or harming others; lost relationships; eating and weight; family; addictive substances; and using technology (see Appendix C). Study 1b, described next, assessed this 78-item PETS scale for its underlying latent variables.

Study 1b: Finalizing the PETS Scale

The 78-item version of the PETS scale was administered to a sample of MTurk Workers. To investigate the underlying latent constructs, a principal-axis factor analysis was performed on the scale ratings. One more round of item reduction resulted in a 60-item PETS scale, which was examined for its factor structure and internal consistency.

Participants

The sample of MTurk Workers consisted of 825 individuals. Workers were compensated with $0.80 on successful completion of the HIT. Individuals who did not respond correctly or who did not respond at all to the IMC (7.3%) were excluded. There were no significant differences between those included versus excluded on age, sex, or race. Mean age of the final sample (N = 765; 323 female, 440 male, 2 not reporting sex) was 31.0 years (SD = 10.8; range: 18–69). Of participants who indicated race, 80.9% were White, 6.2% Asian or Asian American, 4.3% Hispanic, 3.1% African American, 0.4% Native American, and 5.1% Multiracial. All participants were from the United States.

The samples from the pilot study and Study 1b were largely independent; 5 of those who participated in the pilot study also participated in Study 1b. There were 142 MTurk Workers who participated in both Study 1a and Study 1b. Again, it should be noted that since MTurk Worker IDs could not be matched with responses, it could not be ascertained which of the MTurk Workers were excluded from analyses.

Procedure

The study was hosted on Qualtrics. After providing informed consent and demographic information, participants completed the 78-item PETS scale as well as a set

of questionnaires used to assess the scale's validity. The order of presentation of the 78-item PETS scale and the set of questionnaires was counterbalanced across participants, as was the order of presentation of the questionnaires themselves. Results regarding the scale's validity will be reported in Study 1e. After completing the 78-item PETS scale and the set of questionnaires, participants responded to an IMC, were thanked, and then debriefed.

Measures

78-item PETS scale. The 78-item PETS scale (see Appendix C) began with the following prompt: "Sometimes people try not to think about things. For example, people might try to push away thoughts of nightmares or their past lovers. How often do you TRY NOT to think about each of the following?" Participants indicated, using a 5-point scale (*never try not to think about*, *once or twice try not to think about*, *occasionally try not to think about*, *frequently try not to think about*, *constantly try not to think about*), how often they try not to think about each of the target thoughts. The order of all items was randomized for each participant.

Instructional Manipulation Check. The IMC was the same as that used in Study 1a with the exception that participants were asked to type, "The instructions were read" in the text-entry box instead of "I read the instructions."

Results and Discussion

Responses on the 78-item PETS scale were subjected to a principal-axis factor analysis with varimax rotation. After distilling the item list further, the factor structure and internal consistency of the resultant 60-item PETS scale were examined.

Constructing the 60-item PETS scale. A principal-axis factor analysis[1] of the responses from the 78-item PETS scale with varimax rotation yielded a 16-factor solution

[1] The two main data reduction techniques include principal-components analysis (PCA) and common factor analysis (FA). Both are used to summarize patterns of correlations among variables. The difference between the two lies in the variance that is analyzed: in PCA, all the variance (including unique and error variance) of each of the variables is analyzed whereas in FA, the covariance among the variables (i.e., variance each variable shares with the other variables) is analyzed. A PCA produces an empirical summary of the data set and is usually conducted before a FA to examine the maximum number and nature of the factors. In contrast, a FA is typically used to investigate the underlying latent constructs uncontaminated by unique and error variability. Nevertheless, with large sample sizes—as is the case here—PCA and FA solutions are very similar with the main difference being that loadings for the FA solution are smaller.

Originally, for both Study 1a and Study 1b, a PCA with varimax rotation was conducted in lieu of a FA since there were no a priori hypotheses about the nature of the underlying structure. This resulted in a 60-item PETS scale, which was subsequently analyzed for its internal consistency (Study 1b), generalizability (Study 1c), temporal stability (Study 1d), and validity (Study 1e). Study 2 also used these 60 items. After completing Study 1b through Study 2, a FA was conducted on the PETS scale ratings from Study 1a and Study 1b to examine potential discrepancies in the PCA versus FA solutions.

When a principal-axis factoring (PAF)—one of several FA techniques—with promax rotation was conducted on Study 1a's 107-item PETS scale ratings, a 19-factor solution (all initial eigenvalues > 1) accounting for 59% of the common variance resulted. The PAF with promax rotation provided a better simple structure than did the PCA with varimax rotation. For the PAF solution, items related to accidents loaded strongly on its own factor and cross-loadings were low. These items, however, were removed from subsequent analyses since the initial PCA solution revealed low primary loadings and unrelated items loading highly on the accidents factor. Otherwise, the PAF and PCA solutions were identical.

When a PAF with promax rotation was conducted on Study 1b's 78-item PETS scale ratings, a 16-factor solution (all initial eigenvalues > 1) accounting for 59% of the common variance resulted. Again, the PAF with promax rotation provided a better simple structure than did the PCA with varimax rotation. For the PAF solution, items related to self-deprecation loaded strongly on its own factor and cross-loadings were low. These items, however, were removed from subsequent analyses since the initial PCA solution revealed high cross-loadings and unrelated items loading highly on the self-deprecation factor. Otherwise, the PAF and PCA solutions were identical.

In sum, the PCA and PAF solutions were very similar, which was expected given the sample sizes. Study 1b through Study 2 present results based on the items in the 60-item PETS scale. Items related to accidents and to self-deprecation (9 items in total; Appendix D) that were excluded from Study 1b through Study 2 were included in Study 3. The factor structure of the 69-item scale was largely similar to that of the 60-item PETS scale (see Study 3), suggesting that the omission of the 9 items in Study 1b through Study 2 was not a serious concern.

(all initial eigenvalues > 1) accounting for 59% of the common variance. The 16 factors were comprised of thoughts related to the categories listed in Appendix C.

To refine the item list, an item-reduction process was carried out. First, items that had primary loadings < .35 or cross-loadings ≥ .35 were removed. Further, within the corresponding factor, items displaying low interitem correlations were removed. To maintain a roughly equal number of items per factor, it was decided that each factor would be comprised of three to five items. Therefore, after item deletion, if a factor had only two remaining items, those two items were removed. Finally, the remaining items were individually inspected to ensure that all items loading on each factor were conceptually similar; those that were not were removed. This item-reduction process resulted in a 60-item PETS scale.

The orthogonal (varimax) and oblique (promax) solutions for the ratings of the 60 items were essentially identical. The mean correlation among the oblique factors (r = .40) suggested that there was more than 10% overlap in variance among the factors (Tabachnick & Fidell, 2007). This warrants an oblique rotation, which makes intuitive sense given that a person who uses thought suppression as a mental control strategy for one thought is also likely to use the same strategy for other thoughts. Therefore, results for the principal-axis factor analysis with promax rotation will be reported.

A principal-axis factor analysis with promax rotation on the 60 items extracted 14 factors (all initial eigenvalues > 1) accounting for 60% of the common variance. The factors were comprised of the following target thought categories: financial concerns; harm or death; religious guilt; sex; academic or job pressures; aggression; health concerns; social anxiety; physical contamination; lost relationships; eating and weight;

family; addictive substances; and using technology. All items had primary loadings > .40 and cross-loadings < .30 (see Table 1).

Internal consistency. The internal consistency for the entire scale was high (Cronbach's α = .96). The reliability of each of the thought category subscales ranged from moderate to high (see Table 1).

In sum, the final 60-item PETS scale consisted of 14 factors that were easily interpretable and correlated with each other. The PETS scale as a whole and the individual thought category subscales demonstrated substantial internal consistency. Is this factor structure generalizable across samples though? This question was addressed in the next study.

Table 1

Psychometric Properties of the 60-Item Profiles of Everyday Thought Suppression (PETS) Scale

Thought Category Subscale (Cronbach's α)	Items	Primary Factor Loading†
Financial Concerns (.93)	How little cash I have	.92
	Running out of money	.91
	Not having enough money	.85
	My depleting bank account	.82
	Having to spend money on things I can't afford	.75
Harm or Death (.86)	The possible death of a loved one	.96
	Something bad happening to a loved one	.77
	My family getting sick	.77
	The death of a loved one	.67
	Dying	.51
Religious Guilt (.92)	God judging me	.89
	God knowing that I've done something wrong	.88
	Being punished for sinning	.84
	God being angry with me	.82
	Going to hell	.70
Sex (.85)	Viewing porn	.82
	Nude images of others	.76
	Masturbating	.72
	Performing sexual acts with someone	.68
	Being sexually attracted to someone	.57
Academic or Job Pressures (.88)	Stress from work or school	.94
	Difficulties at work or at school	.89
	The amount of things I have to get done for work or for school	.79
	Work or school deadlines	.74
	Wanting to leave my job or school	.50
Aggression (.83)	Smashing things	.80
	Hitting someone	.79
	Doing harmful things to others	.57
	How angry I am	.56
	Cursing or shouting obscenities	.42
Health Concerns (.80)	My health problems	.90
	An illness I might have	.71
	How much pain my body is in	.58
	Going to the doctor	.54

Table 1 (Continued).

Thought Category Subscale (Cronbach's α)	Items	Primary Factor Loading†
Social Anxiety (.84)	Uncomfortable social situations	.84
	Feeling nervous around others	.78
	Doing or saying something embarrassing in front of others	.67
Physical Contamination (.71)	Bodily wastes (e.g., secretions, urine, feces, saliva, blood)	.77
	Images of insects (i.e., spiders, cockroaches, centipedes, worms, bedbugs)	.57
	Dirt or germs on things	.48
Lost Relationships (.87)	My ex-boyfriend or ex-girlfriend	.89
	Relationships I no longer have	.82
	Relationships that have gone sour	.78
Eating and Weight (.86)	The amount of calories I eat	.83
	My weight	.77
	Eating snacks	.70
	Unhealthy foods I've eaten	.69
Family (.72)	My mother	.76
	My brother or sister	.59
	My father	.56
	Relationship problems with family members or relatives	.53
Addictive Substances (.76)	Using illegal or illicit drugs	.80
	Smoking marijuana	.69
	Smoking a cigarette	.55
	Drinking an alcoholic beverage	.41
Using Technology (.84)	Using my computer	.86
	Checking my e-mail	.75
	Checking social networking sites (i.e., Facebook, Twitter)	.73
	Checking my phone	.65
	Using the Internet	.58

Note: Cronbach's alpha for full scale = .96.

† All cross-loadings < .30

Study 1c: Generalizability of the PETS Scale

To evaluate the generalizability of the PETS scale's factor structure across samples, the 60-item PETS scale was administered to another sample of MTurk Workers four months after Study 1b. Confirmatory factor analyses were conducted to compare the fit of three models: a one-factor model (i.e., all 60 items loading on a single factor), a 14-factor model in which the orthogonality of the factors was specified, and a 14-factor model in which the factors were allowed to intercorrelate.

Participants

The sample of MTurk Workers consisted of 810 individuals. Workers were compensated with $0.38 on successful completion of the HIT. Individuals who did not respond correctly or who did not respond at all to the IMC (9.5%) were excluded. There were no significant differences between those included versus excluded on age, sex, or race. Mean age of the final sample (N = 733; 291 female, 436 male, 3 Other, 3 not reporting sex) was 30.4 years (SD = 10.6; range: 18–71). Racial composition of the sample was 76.4% White, 7.6% Asian or Asian American, 5.3% African American, 3.7% Hispanic, 0.3% Native American, 0.3% Native Hawaiian or Pacific Islander, and 6.4% Multiracial. All participants were from the United States.

There were 38 MTurk Workers who participated in both Study 1a and Study 1c and 43 MTurk Workers who participated in both Study 1b and Study 1c. Since MTurk Worker IDs could not be matched with responses, it could not be ascertained which of the MTurk Workers were excluded from analyses.

Procedure

The study was hosted on Qualtrics. After providing informed consent and demographic information, participants completed the 60-item PETS scale and then a set of questionnaires used to assess the validity of the PETS scale (see Study 1e). Participants then responded to an IMC, were thanked, and debriefed.

Measures

60-item PETS scale. The 60-item PETS scale began with the following prompt: "Sometimes people try not to think about things. For example, people might try to push away thoughts of nightmares or their past lovers. How often do you TRY NOT to think about each of the following?" Participants indicated, using a 5-point scale (*never try <u>not</u> to think about*, *once or twice try <u>not</u> to think about*, *occasionally try <u>not</u> to think about*, *frequently try <u>not</u> to think about*, *constantly try <u>not</u> to think about*), how often they try not to think about each of the target thoughts. The order of all items was randomized for each participant.

Instructional Manipulation Check. For the Instructional Manipulation Check (IMC; Oppenheimer et al., 2009), participants were presented with the following prompt:

> *A number of activities are listed below. Which is your favorite activity?*
>
> *Studies have shown that people prefer to minimize their effort as much as possible when reading questions. If you are reading this question and have read all the other questions, please select the response*

option 'Other' and type 'Yes, I read them.' in the box below. Thank you for taking the time to read through the questions carefully.

The response options included: *Watching TV and/or movies*, *Going to the gym*, *Using social networking sites (e.g., Facebook, Twitter, Pinterest)*, and *Other*.

Results and Discussion

Confirmatory factor analyses were conducted using the lavaan package in R (Rosseel, 2012). Three models were compared: a one-factor model, a 14-factor model in which the orthogonality of the factors was specified, and a 14-factor model in which the factors were allowed to intercorrelate. Given that with large sample sizes, the chi-square statistic is likely to lead to a rejection of an otherwise good-fitting model, multiple criteria were used to evaluate the fit for each model. In addition to the chi-square statistic, three other indices were used: the comparative fit index (CFI), the root-mean-square error of approximation (RMSEA), and the standardized root-mean-square residual (SRMR). According to Hu and Bentler (1999), good-fitting models have CFI values > .95, RMSEA values ≤ .06, and SRMR values ≤ .08.

Results indicated that the one-factor model (all items loading on a single factor) did not provide a reasonable fit, $\chi^2(1{,}710, N = 630) = 12{,}381.0$ (CFI = .46, RMSEA = .10, SRMR = .10). The 14-factor model in which the intercorrelations among the factors were set to zero also did not provide a reasonable fit, $\chi^2(1{,}710, N = 630) = 6{,}703.6$ (CFI = .75, RMSEA = .07, SRMR = .23). In contrast, the 14-factor model in which the factors were allowed to freely correlate did provide a good fit, $\chi^2(1{,}619, N = 630) = 3{,}535.5$ (CFI = .90, RMSEA = .04 SRMR = .05). It provided a significantly better fit than the one-

factor model, $\Delta\chi^2(91) = 8{,}845.5$, $p < .001$, as well as the 14-factor orthogonal model, $\Delta\chi^2(91) = 3{,}168.2$, $p < .001$.

In sum, the results provided support for the cross-sample generalizability of the factor structure found in Study 1b. The 14 intercorrelated factors (mean $r = .50$) suggested that the tendency to use thought suppression as a mental control strategy can be generalized across thoughts to an extent, which points to the validity of the WBSI. Despite the strong mean correlation among the factors, the less than perfect correlation and the range in correlation strengths among factors (r range: .17–.80) indicated that the generalized tendency to suppress thoughts is not consistent across all thought topics. Instead, there are meaningful distinctions to be made among the different thought contents people might decide to suppress. This therefore underscores the need for a scale that assesses the frequencies with which various thought contents are suppressed. Having established the cross-sample stability of the 60-item PETS scale's factor structure, the next study set out to examine the scale's temporal stability.

Study 1d: Test-Retest Reliability of the PETS Scale

To examine the temporal stability of the 60-item PETS scale, participants recruited from the Harvard University Psychology Study Pool were asked to complete the PETS scale twice within a period of four weeks. Intraclass correlation coefficients for the total PETS scale and the individual thought category subscales were computed.

Participants

A total of 116 Harvard University students who volunteered in exchange for course credit were recruited from the Harvard University Study Pool during the fall semester of 2012. Individuals who did not respond correctly or who did not respond at all to the IMC in both the first and second administrations of the PETS scale (21.6%) were excluded. There were no significant differences between those included versus excluded on age, sex, or race. Mean age of the final sample ($N = 91$; 73 female, 18 male) was 24.5 years ($SD = 8.3$; range: 18–56). Of participants who indicated race, 59.6% were White, 22.4% Asian or Asian American, 9.0% Multiracial, 3.4% African American, 3.4% Hispanic, and 2.2% self-reported as Other.

Procedure

The study was hosted on Qualtrics. After providing informed consent and demographic information, participants completed the 60-item PETS scale as well as a set of questionnaires used to assess the validity of the PETS scale (see Study 1e). The order of presentation of the PETS scale and the set of questionnaires was counterbalanced across participants, as was the order of presentation of the questionnaires themselves. Participants then responded to an IMC, were thanked, and debriefed.

Three weeks after completing the first administration of the PETS scale, participants were invited to complete the second administration of the PETS scale within one week. After completing the scale, participants responded to another IMC, were thanked, and then debriefed.

Measures

60-item PETS scale. The 60-item PETS scale began with the following prompt: "Sometimes people try not to think about things. For example, people might try to push away thoughts of nightmares or their past lovers. How often do you TRY NOT to think about each of the following?" Participants indicated, using a 5-point scale (*never try not to think about*, *once or twice try not to think about*, *occasionally try not to think about*, *frequently try not to think about*, *constantly try not to think about*), how often they try not to think about each of the target thoughts. The order of all items was randomized for each participant.

Instructional Manipulation Check. The IMCs were similar to that used in Study 1a. For the first administration of the IMC, participants were instructed to type, "I read the instructions" in the text-entry box. For the second administration of the IMC, participants were instructed to type, "All questions were read" in the text-entry box.

Results and Discussion

Prior to analyses, the distributions of the PETS scale total scores and subscales scores were examined. Since the total scores exhibited a moderate positive skew, a square root transformation was applied. All subscale scores were either moderately or

strongly positively skewed, thus all subscale scores were subjected to log transformations to allow for consistent interpretations across subscales.

First, it was examined whether suppression-frequency ratings significantly differed over the four-week period. A series of paired-samples *t*-tests were performed for the total PETS scale and the subscales to assess whether individuals generally receive the same scores over repeated assessments. Next, to evaluate whether individuals were ranked similarly over repeated assessments, intraclass correlation coefficients (ICC; McGraw & Wong, 1996; Shrout & Fleiss, 1979) were computed for the total PETS scale and subscales using a two-way random effects model and type consistency.

Changes in absolute suppression-frequency ratings over time. In general, the reported frequencies with which people suppressed thoughts decreased across the four-week period. There was a significant decrease in PETS scale total scores across the first (M = 61.4, SD = 31.7) and second (M = 55.2, SD = 33.4) administrations, $t(90) = 3.17$, $p = .002$, $r = .32$. For the subscales, there was a significant decrease in the reported frequency with which people suppressed thoughts of harm or death ($M_{\text{Time 1}} = 7.6$, $SD_{\text{Time 1}} = 4.7$; $M_{\text{Time 2}} = 5.9$, $SD_{\text{Time 2}} = 4.9$), $t(90) = 4.44$, $p < .001$, $r = .42$, and physical contamination ($M_{\text{Time 1}} = 2.3$, $SD_{\text{Time 1}} = 2.5$; $M_{\text{Time 2}} = 1.6$, $SD_{\text{Time 2}} = 1.9$), $t(90) = 3.07$, $p = .002$, $r = .31$.

At least three factors might account for the observed decrease in the reported frequency of thought suppression. First, the results might reflect a true decrease suggesting that students suppress thoughts less often as the academic semester progresses. While the present research was not designed to directly examine why this would be the case, one possibility is that students might have experienced greater stress

(i.e., higher cognitive load) towards the beginning than towards the end of the semester. The higher cognitive load might have resulted in more frequent intrusions (see Wegner, 1994), prompting more frequent suppression attempts.

A second (more likely) factor accounting for the decrease in the suppression-frequency ratings over time is people becoming familiarized with the PETS scale items after the first administration. In particular, people might have found thoughts related to harm or death, aggression, physical contamination, and family more distressing initially but less distressing at the second administration of the PETS scale after having already encountered them previously. Assuming that people are more likely to report frequently suppressing thoughts that are perceived as more distressing, people might have lowered their suppression-frequency ratings across the two assessments as a result of becoming familiarized with thoughts that were initially more distressing.

One other factor that might account for the decrease in suppression-frequency ratings over time is regression toward the mean. Specifically, the name of the study ("Thoughts you try not to think about") might have attracted people who were, at that time, experiencing a high number of intrusions that they frequently try to suppress, resulting in more extreme suppression-frequency ratings at the first administration of the PETS scale. After the four-week period, suppression frequencies might have tended closer to the mean, resulting in the observed decrease in suppression-frequency ratings.

Consistency of suppression-frequency ratings over time. In general, moderate to strong test-retest reliability was observed for the PETS scale total scores and subscales scores. Table 2 presents the single measure ICCs and the 95% confidence intervals.

Taken together, although absolute scores tended to decrease over repeated assessments, relative scores were generally consistent across time. The 60-item PETS scale and subscales therefore demonstrated reasonable temporal stability. In the next study, the convergent and discriminant validity of the scale was assessed.

Table 2

Single Measure Intraclass Correlation Coefficients for the 60-Item PETS Scale and Subscales

Scale or Subscale	ICC†	95% CI
Total PETS Scale	.78	.68–.85
Financial Concerns	.76	.66–.83
Harm or Death	.57	.42–.70
Religious Guilt	.74	.63–.82
Sex	.65	.52–.76
Academic or Job Pressures	.77	.67–.84
Aggression	.69	.56–.78
Health Concerns	.62	.48–.73
Social Anxiety	.46	.28–.61
Physical Contamination	.66	.53–.76
Lost Relationships	.64	.50–75
Eating and Weight	.76	.65–.83
Family	.78	.69–.85
Addictive Substances	.54	.37–.67
Using Technology	.70	.57–.79

Note. ICC = Intraclass Correlation Coefficient; CI = Confidence Interval. Total PETS scale scores were square-root-transformed and all subscale scores were log-transformed.

† All *p*s < .001

Study 1e: Validity of the PETS Scale

The validity of the 60-item PETS scale was evaluated in three ways. First, the convergent and discriminant validity of the total PETS scale was assessed. Next, the validity of each of the thought category subscales was examined. Finally, the association between scores on the PETS scale and the tendency to respond in a socially desirable manner was assessed.

To evaluate the validity of the total PETS scale, a range of questionnaires measuring constructs such as personality, health complaints, and satisfaction with life were administered. Logically, the frequency of suppressing various thoughts should be strongly related to the general tendency to suppress thoughts as well as the general tendency to experience intrusions. People who tend to experience intrusions are likely to attempt suppression more often, and thus would self-report a high tendency to suppress thoughts. Frequent suppression attempts might then provoke more intrusions, resulting in a vicious cycle. The PETS scale, which measures the frequency of suppressing various thoughts, was therefore expected to be positively and strongly associated with the WBSI Suppression subfactor and Intrusion subfactor. It then follows that the PETS scale should be associated with other measures that correlate with the WBSI.

The WBSI has been positively associated with measures of neuroticism, anxiety, depression, obsessional thinking, worry, and intrusive thinking (Muris et al., 1996; Wegner & Zanakos, 1994). Although the tendency to suppress thoughts has been suggested to cause symptoms of anxiety, depression, and obsessions, this tendency has also been proposed to develop *as a result of* experiencing these symptoms. That is, in experiencing unwanted thoughts associated with these psychopathologies, people *react* to

them by trying to suppress them from consciousness (Najmi & Wegner, 2008). The tendency to suppress thoughts therefore serves as a coping technique in response to stress and other unwanted life experiences (Wegner & Pennebaker, 1993). Accordingly, it is likely that the WBSI—and thus the PETS scale—would be associated with measures assessing a variety of complaints, concerns, and expressions of negative affect.

With respect to the present research, constructs expected to be strongly and positively associated with the PETS scale included the general tendency to suppress thoughts, the general tendency to experience intrusions, neuroticism, and health complaints. In contrast, constructs expected to be negatively associated with the PETS scale included mindful/receptive awareness and attention, satisfaction with life, and the perceived control over one's own thoughts. Constructs expected to be less or not related to the PETS scale included openness, conscientiousness, extraversion, and agreeableness.

The validity of each of the thought category subscales was also examined. To achieve this, a series of questions assessing the degree of personal relevance of each thought category subscale was administered. The operationalizations of personal relevance were based on self-reports of behaviors (e.g., alcohol consumption) and evaluations (e.g., satisfaction with current financial status) related to the various subscales. Suppression-frequency ratings for each subscale were then correlated with the corresponding personal relevance indicator.

Finally, the association between the PETS scale and the tendency to respond in a socially desirable manner was assessed. Since people who tend to respond in a socially desirable manner might conceivably be less willing to admit to experiencing

unwanted/negative thoughts and thus would perceive having less of a need to suppress these thoughts, a negative correlation was expected.

Participants and Procedure

Participants were from Study 1b (N = 765 MTurk Workers), Study 1c (N = 733 MTurk Workers), and Study 1d (N = 91 students from the Harvard University Psychology Study Pool). The procedure is described in the corresponding chapters.

Measures

Measures of personality. A variety of measures were used to assess personality. At the broadest level, personality was measured with the Big Five Inventory (BFI; John & Srivastava, 1999). Participants rated (1 = *Disagree strongly*; 5 = *Agree strongly*) the extent to which they agreed to 44 statements tapping the five broad personality domains. The reliabilities of the neuroticism (Cronbach's α = .86–88), openness (Cronbach's α = .82–86), conscientiousness (Cronbach's α = .87), extraversion (Cronbach's α = .87), and agreeableness (Cronbach's α = .81–.85) scales were high.

The self-reported general tendency to suppress thoughts and general tendency to experience intrusions in everyday life were assessed with the White Bear Suppression Inventory (WBSI; Wegner & Zanakos, 1994). The questionnaire includes 15 statements and participants rated (1 = *Strongly disagree*; 5 = *Strongly agree*) the extent to which they agreed that each of the statements was characteristic of them. A principal-axis factor analysis with promax rotation of the WBSI ratings from Study 1b yielded a 2-factor solution (all initial eigenvalues > 1) accounting for 51% of the common variance. The two factors included a WBSI Suppression subfactor (items 1, 10, and 13) and a WBSI Intrusions subfactor (items 2, 3, 4, 5, 6, 7, 9, and 11). The reliabilities of the

Suppression (Cronbach's α = .71–83) and Intrusions (Cronbach's α = .83–.90) subfactors were high.

Awareness and attention to the present moment were assessed with the Mindfulness Attention Awareness Scale (MAAS; Brown & Ryan, 2003). The questionnaire includes 15 statements describing experiences (e.g., "I do jobs or tasks automatically, without being aware of what I'm doing") and participants rated (1 = *Almost Never*; 6 = *Almost Always*) how frequently they have each experience. The reliability of the scale (Cronbach's α = .90) was high.

Health complaints. The Hopkins Symptom Checklist (HSCL; Derogatis, Lipman, Rickels, Uhlenhuth, & Covi, 1974) assessed the frequency of health complaints. Participants reported (1 = *Not at all*; 5 = *Extremely*) the extent to which they experienced each of 45 symptoms (e.g., "hot or cold spells," "blaming yourself for things") in the past week. The HSCL is comprised of five subscales: Anxiety, Depression, Obsessions-Compulsions, Interpersonal-Sensitivity, and Somatization. The reliabilities of the Anxiety (Cronbach's α = .83–88), Depression (Cronbach's α = .90), Obsessions-Compulsions (Cronbach's α = .86–.88), Interpersonal-Sensitivity (Cronbach's α = .85), and Somatization (Cronbach's α = .80–.89) subscales were high.

Satisfaction with life. To measure the general satisfaction with life, the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985) was administered. Participants rated (1 = *Strongly disagree*; 7 = *Strongly agree*) the extent to which they agreed with each of five statements (e.g., "The conditions of my life are excellent"). The reliability of the scale (Cronbach's α = .91–92) was high.

Perceived control over thoughts. Participants rated (0 = *No control at all*; 6 = *Have full control*) how much control they felt they had over their own thoughts.

Subscale-specific behavioral and evaluation-based indicators. Participants were asked questions about behavioral histories related to or evaluations about each thought category subscale. Each question was tailored to the specific thought category subscale to assess the personal relevance of that thought category. For example, questions about cigarette, alcohol, and drug consumption tapped the addictive substances subscale. The order in which the questions were asked was randomized for each participant. Only questions related to the 14 thought categories that were included in the 60-item PETS scale are described below.

1. Financial concerns. Participants indicated how satisfied they are with their current financial status (*0 = Extremely dissatisfied*; *3 = Neither satisfied nor dissatisfied*; *6 = Extremely satisfied*).

2. Harm or death. Participants indicated how uncomfortable they are with the idea of death and dying (*0 = Not at all uncomfortable*; *6 = Extremely uncomfortable*).

3. Religious guilt. Participants who reported that they were religiously affiliated or spiritually involved indicated what role their religious or spiritual preference plays in their lives (0 = *Not at all important*; 6 = *Extremely important*).

4. Sex. Participants reported how often they masturbate (*never*, *less than once a month*, *once a month*, *2-3 times a month*, *once a week*, *2-3 times a week*, *daily*).

5. Academic or job pressures. Participants who indicated that they were attending school or currently employed rated how stressed they are about their school or job (*0 = Not at all stressed*; *6 = Extremely stressed*).

6. Aggression. Participants rated how difficult it is for them to control their temper (0 = *Not at all difficult*; 6 = *Extremely difficult*).

7. Health concerns. Participants indicated how concerned they are about their health (0 = *Not at all concerned*; 6 = *Extremely concerned*).

8. Social anxiety. Participants indicated how uncomfortable they feel in social situations (0 = *Not at all uncomfortable*; 6 = *Extremely uncomfortable*).

9. Physical contamination. Participants rated how concerned they are with contaminants (0 = *Not at all concerned*; 6 = *Extremely concerned*).

10. Lost relationships. Participants reported the number of past romantic relationships in which they had been involved.

11. Eating and weight. Participants indicated how satisfied they are with their current weight (*0 = Extremely dissatisfied*; *3 = Neither satisfied nor dissatisfied*; *6 = Extremely satisfied*).

12. Family. Participants rated how significant a role their mother and father play in their lives (0 = *Not at all significant*; 6 = *Extremely significant*). The scores of these two variables were averaged to create a composite variable representing how significant people's parents are to them.

13. Addictive substances. Participants indicated whether they had ever smoked cigarettes. Those who had smoked before were asked if they currently smoke cigarettes on a regular basis. Participants also indicated how often they have a drink containing alcohol and how often they use illegal or illicit drugs (*never*, *monthly or less*, *2-4 times a month*, *2-3 times per week*, *4 or more times a week*). There were therefore three variables related to the use of addictive substances: smoking status (0 = never smoked before; 1 =

current regular smoker), frequency of alcohol consumption, and frequency of drug consumption. The scores of these three variables were averaged to create a composite variable representing the frequency of consuming cigarettes, alcohol, and drugs.

14. Using technology. Participants indicated whether they owned a smart phone with Internet access.

Socially desirable response bias. In Study 1c, socially desirable responding was assessed with the 20-item Social Desirability Scale (Strahan & Gerbasi, 1972) while in Study 1d, the full 33-item Social Desirability Scale (Crowne & Marlowe, 1960) was used. Participants rated each of the items (e.g., "I have never intensely disliked anyone") as True or False. The reliabilities of the 20-item scale (Kuder-Richardson formula 20 = .79) and the 33-item scale (Kuder-Richardson formula 20 = .77) were good.

Results and Discussion

As in Study 1d, the distribution of the PETS scale total scores exhibited a moderate positive skew while the distributions of the subscale scores were either moderately or strongly positively skewed. Prior to analyses, the PETS scale total scores were subjected to square-root transformations and all subscale scores were subjected to log transformations to allow for consistent interpretations across subscales.

First, to assess the convergent validity of the total PETS scale, correlations were conducted between the PETS scale and constructs that were predicted to be closely related to the frequency of suppressing various thoughts. Then, to assess the discriminant validity of the total PETS scale, correlations were conducted between the PETS scale and constructs expected to be weakly related to the frequency of suppressing various thoughts. Next, the validities of the subscales were evaluated. Finally, to examine

whether people who tend to respond in a socially desirable manner were less likely to report suppressing thoughts, the PETS scale total scores and the individual subscale scores were correlated with scores on the Social Desirability Scale.

Closely related constructs. Correlations between the PETS scale and the range of criterion measures are presented in Table 3. The positive association between the PETS scale and the WBSI Suppression subfactor suggests that both measure similar but not redundant constructs. Although people who report suppressing various thoughts frequently also report a higher general tendency to suppress thoughts, this self-reported tendency to suppress thoughts is not equally generalizable across all thoughts. People who report suppressing various thoughts frequently also reported a higher general tendency to experience intrusions. The positive correlations between the PETS scale and neuroticism, anxiety, depression, and obsessive-compulsive symptoms parallel previous findings (e.g., Muris et al., 1996) while the positive associations between the PETS scale and symptoms of interpersonal sensitivity as well as somatic complaints are in line with the prediction that the frequency of suppressing thoughts should be related to a variety of complaints, concerns, and expressions of negative affect. In experiencing unpleasant symptoms, people react to them by trying to suppress them, which in turn might result in an ironic rebound of symptoms.

Table 3

External Correlates of the 60-Item PETS Scale

Criterion Measure	S1b	S1d
WBSI: Suppression	.48**	.38**
WBSI: Intrusions	.53**	.44**
BFI: Neuroticism	.44**	.44**
HSCL: Anxiety	.50**	.45**
HSCL: Depression	.52**	.52**
HSCL: Obsessions-Compulsions	.53**	.52**
HSCL: Interpersonal-Sensitivity	.54**	.55**
HSCL: Somatization	.48**	.57**
Mindfulness Attention Awareness Scale	–	-.24**
Satisfaction With Life Scale	-.29**	-.16
Perceived Control Over Own Thoughts	-.36**	-.35**
BFI: Openness	-.16**	-.13
BFI: Conscientiousness	-.26**	-.07
BFI: Extraversion	-.11**	.06
BFI: Agreeableness	-.18**	-.16

Note. S1b = Study 1b; S1d = Study 1d; WBSI = White Bear Suppression Inventory; BFI = Big Five Inventory; HSCL = Hopkins Symptom Checklist. Sample sizes for Study 1b and Study 1d are 765 and 91, respectively. Dashes indicate that data were not collected. Total PETS scores were square-root-transformed.

**$p < .01$.

The negative correlations between the PETS scale and levels of mindfulness parallel previous findings (e.g., Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) suggesting that people who suppress thoughts frequently are less accepting of their own

thoughts. In line with the notion that people who suppress thoughts often should exhibit more complaints and expressions of negative affect, the PETS scale was negatively correlated with people's general satisfaction with life. People who suppress thoughts often are also less likely to perceive having control over their own thoughts.

Less related constructs. Due to the sample size of Study 1b, even small correlations are likely to be statistically significant. Thus, to evaluate the discriminant validity of the PETS scale, the strength of the correlations should be inspected. In comparison to the other constructs, the PETS scale was less correlated with measures of openness, conscientiousness, extraversion, and agreeableness.

Suppression frequency as a function of behavioral histories and evaluations. Correlations between the suppression-frequency ratings for each thought category subscale and the corresponding behavioral or evaluation-based indicator were conducted (see Table 4). All such indicators were recoded such that higher scores reflected more frequent behaviors related to a target thought category (e.g., 0 = *Never*, 6 = *Daily*), more negative evaluations about a target thought category (e.g., 0 = *Extremely satisfied*, 6 = *Extremely dissatisfied*), or greater significance of the target thought category to the person (e.g., 0 = *Not at all important*, 6 = *Very important*). Therefore, positive correlations indicated that a target thought category is more frequently suppressed if the person engages more frequently in behaviors related to the thought category, feels more negatively toward the thought category, or feels that items related to the thought category play an important role in their life.

On the whole, the more often people engage in behaviors related to a particular thought category, the more often they suppress the corresponding thought category.

Similarly, the more dissatisfied, uncomfortable, or concerned people are with a particular thought category, the more often they suppress the corresponding thought category.

Table 4

External Correlates of the 60-Item PETS Subscales

Subscale	Behavioral or Evaluation-Based Indicator	S1b	S1d
Financial Concerns	How dissatisfied with current financial status?	.44**	.57**
Harm or Death	How uncomfortable with idea of death and dying?	.32**	.27*
Religious Guilt	How important is religious or spiritual preference?	.16**	.26
Sex	How often masturbate?	.18**	.14
Academic or Job Pressures	How stressed about school or job?	.49**	.58**
Aggression	How difficult is it to control own temper?	.36**	.52**
Health Concerns	How concerned about own health?	.36**	.18
Social Anxiety	How uncomfortable in social situations?	.45**	.20
Physical Contamination	How concerned about contaminants?	.22**	.27*
Lost Relationships	How many past romantic relationships?	.11**	.21
Eating and Weight	How dissatisfied with current weight?	.45**	.37**
Family	How significant are one's mother and father?	-.10**	-.25*
Addictive Substances	How often consume cigarettes, alcohol, and drugs?	.30**	.01
Using Technology	Have smart phone with Internet access?	.16**	.02

Note. S1b = Study 1b; S1d = Study 1d. Sample sizes for Study 1b and Study 1d are 765 and 91, respectively. All subscale scores were log-transformed.

*$p < .05$. **$p < .01$.

People who are more dissatisfied with their current financial status suppress thoughts about financial concerns more often; people who are more uncomfortable with the idea of death and dying suppress thoughts of harm or death more often; the more important a person's religious or spiritual preference is, the more often they suppress thoughts about religious guilt; people who masturbate more frequently suppress thoughts of sex more often; people who are more stressed about their school or job suppress thoughts about academic or job pressures more often; people who find it difficult to control their temper suppress thoughts of aggression more often; people who are more concerned about their health suppress thoughts of their health concerns more often; people who feel more uncomfortable in social situations suppress thoughts related to social anxiety more often; people who are more concerned with contaminants suppress thoughts of physical contamination more often; people who have had more past romantic relationships suppress thoughts of lost relationships more often; people who are more dissatisfied with their weight suppress thoughts related to eating and weight more often; people who rated their parents as playing less of a significant role in their lives suppress thoughts about their family more often; people who consume cigarettes, alcohol, and drugs more frequently suppress thoughts of addictive substances more often; and people who have a smart phone with Internet access suppress thoughts of using technology more often than people who don't have one.

The weak correlations for several subscales (i.e., religious guilt, sex, lost relationships, family, using technology) suggest that the behavioral or evaluation-based indicators used might not have best gauged personal relevance of the corresponding thought. Nevertheless, taken as a whole, the self-reported frequencies of suppressing the

various thought categories are associated with people's behavioral histories and evaluations of the corresponding thought category.

Socially desirable responding and the PETS scale. Scores on the Social Desirability Scale (SDS) were negatively correlated with total scores on the PETS scale in Study 1c, $r(731) = -.16$, $p < .001$, and Study 1d, $r(89) = -.29$, $p = .005$. Although SDS scores and PETS scale scores were weakly correlated (see Cohen, 1992), the direction of the relationship suggests that people who tend to respond in a socially desirable manner report suppressing thoughts less frequently.

To examine whether the tendency to respond in a socially desirable manner was more applicable to certain thoughts, scores on the SDS were correlated with each of the PETS subscale scores (see Table 5). Again, due to the sample size of Study 1c, more focus should be placed on the strength and not the statistical significance of the correlations. Thus, only correlations > .20 will be interpreted. The results should also be interpreted in light of the sample characteristics: Study 1c's sample was comprised of a more demographically diverse pool of MTurk Workers while the majority of Study 1d's sample was Harvard University undergraduate students.

None of the correlations in Study 1c were > .20, suggesting that for MTurk Workers, the tendency to respond in a socially desirable manner was not associated with the self-reported frequency of suppressing thoughts. Results for Study 1d, however, suggested that for Harvard University undergraduates, those who tend to respond in a socially desirable manner report suppressing thoughts of financial concerns, sex, academic or job pressures, aggression, and family less often.

Table 5

Socially Desirable Responding and the 60-Item PETS Subscales

Subscale	S1c	S1d
Financial Concerns	-.12**	-.30**
Harm or Death	-.10**	-.07
Religious Guilt	.02	-.19
Sex	-.14**	-.26*
Academic or Job Pressures	-.14**	-.32**
Aggression	-.20**	-.32**
Health Concerns	-.07	-.14
Social Anxiety	-.18**	-.13
Physical Contamination	-.07	-.13
Lost Relationships	-.15**	-.08
Eating and Weight	-.15**	-.15
Family	-.10**	-.29**
Addictive Substances	-.06	-.13
Using Technology	-.07	-.06

Note. S1c = Study 1c; S1d = Study 1d. Sample sizes for Study 1c and Study 1d are 733 and 91, respectively. Study 1c used the 20-item Social Desirability Scale while Study 1d used the full 33-item Social Desirability Scale. All subscale scores were log-transformed. *$p < .05$. **$p < .01$.

One reason for why people might report suppressing a thought less frequently is because the thought rarely or never occurs, thus there is no need to suppress the thought. Put another way, frequent suppression of a thought can be taken as a proxy for frequent occurrence of the thought. Given that thoughts of sex and aggression are considered immoral or socially unacceptable, people who have a greater need to present themselves in a favorable light might be less willing to admit to having such thoughts, and thus

would be less willing to report suppressing them frequently. Thoughts of academic pressures, financial concerns, and family problems might also be considered taboo among undergraduate students, and so students who tend to respond in a socially desirable manner might be less willing to admit to having—and thus suppressing—such thoughts. These speculations should be tested more directly in future research.

In sum, the 60-item PETS scale displayed good convergent and discriminant validity. The validity of the various subscales was also demonstrated through the associations between the subscale scores and the corresponding personal relevance indicators. Although on the whole, the tendency to respond in a socially desirable manner was only weakly related to the self-reported frequency of suppressing thoughts, undergraduate students who have a greater need to present themselves in a favorable light are less likely to report suppressing thoughts considered taboo (e.g., sex, academic pressures). As mentioned, the frequency with which people report suppressing a thought might be a function of how often the thought is experienced; thoughts that occur often are more likely to be suppressed. At the same time, however, not all frequent thoughts are suppressed to the same extent. Some thoughts might be suppressed whenever they appear in our minds whereas others are rarely suppressed despite their repetitiveness. In the next study, these issues were explored.

Study 2: Seeking Explanations for the Relative Frequencies of Suppression

Are all thoughts that occur frequently invariably subject to suppression attempts? To examine this, information regarding the frequency with which the 60 target thoughts are experienced and the proportion of time the 60 target thoughts are suppressed was gathered from a sample of MTurk Workers. These data were also compared with the 60-item PETS scale results from Study 1b and Study 1c in which people were asked to report how often they suppress each of the 60 target thoughts.

Participants

The sample of MTurk Workers consisted of 817 individuals. Workers were compensated with $0.38 on successful completion of the HIT. Individuals who did not respond correctly or who did not respond at all to the IMC (16%) were excluded. There were no significant differences between those included versus excluded on age, sex, or race. Mean age of the final sample (N = 686; 289 female, 390 male, 3 Other, 4 not reporting sex) was 30.7 years (SD = 10.6; range: 18–75). Of those who indicated race, 76.9% were White, 7.0% Asian or Asian American, 5.0% African American, 3.4% Hispanic, 0.4% Native American, 0.3% Native Hawaiian or Pacific Islander, 6.7% Multiracial, and 0.3% self-reported as Other. All participants were from the United States.

Of the 817 MTurk Workers who participated in Study 2, there were 32 who also participated in Study 1a, 55 in Study 1b, and no repeat responders in Study 1c. As before, it could not be ascertained which of the MTurk Workers were excluded from analyses.

Procedure

The study was hosted on Qualtrics. After providing informed consent and demographic information, participants rated how often they experience each of the thoughts included in the 60-item PETS scale. Participants then indicated what proportion of the time they suppress each of the 60 thoughts. Finally, participants responded to an IMC, were thanked, and then debriefed.

Measures

Frequency of experiencing target thoughts. The following prompt was presented: "For each thought below, indicate how often you experience the thought. In general, how often does the thought come to mind?" Participants indicated, using a 5-point scale (*never*, *once or twice*, *occasionally*, *frequently*, *constantly*), how often they experience each of the 60 (PETS scale) target thoughts. The order of all items was randomized for each participant. Ratings ranged from 0–4 such that 0 corresponded to "never experience the thought" and 4 corresponded to "constantly experience the thought."

Proportion of time target thoughts are suppressed. The following prompt was presented: "For each thought below, of all the times you've experienced the thought, how often do you try NOT to think about it? That is, what proportion of the time do you try NOT to think about the thought each time it occurs?" Participants indicated, using a 6-point scale (*thought never occurs*, *never try <u>not</u> to think about*, *once or twice try <u>not</u> to think about*, *occasionally try <u>not</u> to think about*, *frequently try <u>not</u> to think about*, *constantly try <u>not</u> to think about*), what proportion of the time they try not to think about each of the 60 (PETS scale) target thoughts. The order of all items was randomized for

each participant. Ratings ranged from 0–4 such that 0 corresponded to "never try not to think about" and 4 corresponded to "constantly try not to think about."

Instructional Manipulation Check. The Instructional Manipulation Check (IMC; Oppenheimer et al., 2009) was the same as that used in Study 1c.

Results and Discussion

First, the self-reported frequencies with which the thought categories are experienced were compared with the self-reported proportions of time with which the thought categories are suppressed. Then, results across studies were examined to identify common trends or discrepancies. Specifically, results from the present study were compared with the 60-item PETS subscale scores from Study 1b and Study 1c.

Experiencing versus suppressing target thoughts. Since the number of thought-items that comprised each thought category subscale ranged from 3–5 items (e.g., the "lost relationships" subscale has 3 items while the "financial concerns" subscale has 5 items; see Table 1), subscale mean-scores were computed for each participant. Computing mean-scores (as opposed to summing the individual thought-item scores) allows for comparisons among thought categories since subscale mean-scores for all thought categories range from 0–4. For each of the 14 thought categories, there were two subscale mean-scores: one subscale mean-score representing the mean frequency with which a thought category is *experienced* and the other subscale mean-score representing the mean proportion of time with which a thought category is *suppressed*.

To assess whether the frequency with which a thought category is experienced is related to the proportion of time with which it is suppressed, two sets of analyses were carried out. First, the relationship was assessed separately for each thought category.

That is, the frequency with which a thought category is experienced was correlated with the proportion of time the *corresponding* thought category is suppressed. Since the subscale mean-scores were positively skewed, log transformations were applied before conducting correlations. Next, all 14-thought categories were considered as a whole, and the relationship between the frequency with which the thought categories are experienced and the proportion of time with which the thought categories are suppressed was examined.

Thought categories considered separately. Correlations for each thought category ranged from .17 to .59 (all *p*s < .001). The consistent positive associations across thought categories suggest that in general, when thoughts are experienced often, people are likely to suppress them for a greater proportion of the time that they occur. Conceivably, frequently occurring thoughts are perceived as particularly intrusive, and so people are more likely to suppress them whenever they occur. In contrast, thoughts that occur only once or twice are less salient among the flood of other thoughts, and thus are less likely to prompt suppression attempts when they occur.

Although the correlations were consistently positive across the 14 thought categories, the coefficients ranged from weak to strong (see Figure 1). This range suggests that the strength of the association between the frequency of thought occurrences and the proportion of time with which they are suppressed varies with the particular thought category. Consider the two extremes of this range, thoughts related to financial concerns, $r(672) = .59$, and thoughts related to using technology, $r(675) = .17$. Most people who frequently experience thoughts of financial concerns are likely to suppress such thoughts whenever they occur. At the same time, most people who rarely

experience thoughts of financial concerns are not likely to suppress such thoughts whenever they occur, perhaps because the infrequency of the thoughts make them easier to disregard. In contrast, for thoughts related to using technology, the weaker correlation suggests that for a given frequency of experience, there is greater variation in whether or not people resort to suppressing such thoughts when they occur. That is, for people who experience thoughts of, say, checking their e-mail at a given frequency, there is more of a range in whether people push away the thought each time it occurs or whether people click the refresh button of their inbox each time the thought occurs.

In general, the more frequently a thought is experienced, the more likely it is to be suppressed for a greater proportion of the time it occurs. The strength of this association, though, depends on the content of the thought, with the weaker correlations suggesting that not all frequently experienced thoughts are invariably suppressed and that not all rarely experienced thoughts are seldom suppressed. A similar finding emerged when all thought categories were considered together, the results of which will be discussed next.

Thought categories considered together. Figure 1 compares the self-reported frequencies with which the 14 thought categories are experienced with the proportions of time with which the 14 thought categories are suppressed. The skewed distributions of the subscale mean-scores suggested that median values (i.e., medians of the subscale mean-scores) provided better indicators of central tendency. Median values for the proportion of time with which thoughts are suppressed were based on ratings from people who reported that they do experience the thought to some extent—those who indicated that the *thought never occurs* were not included when computing these medians.

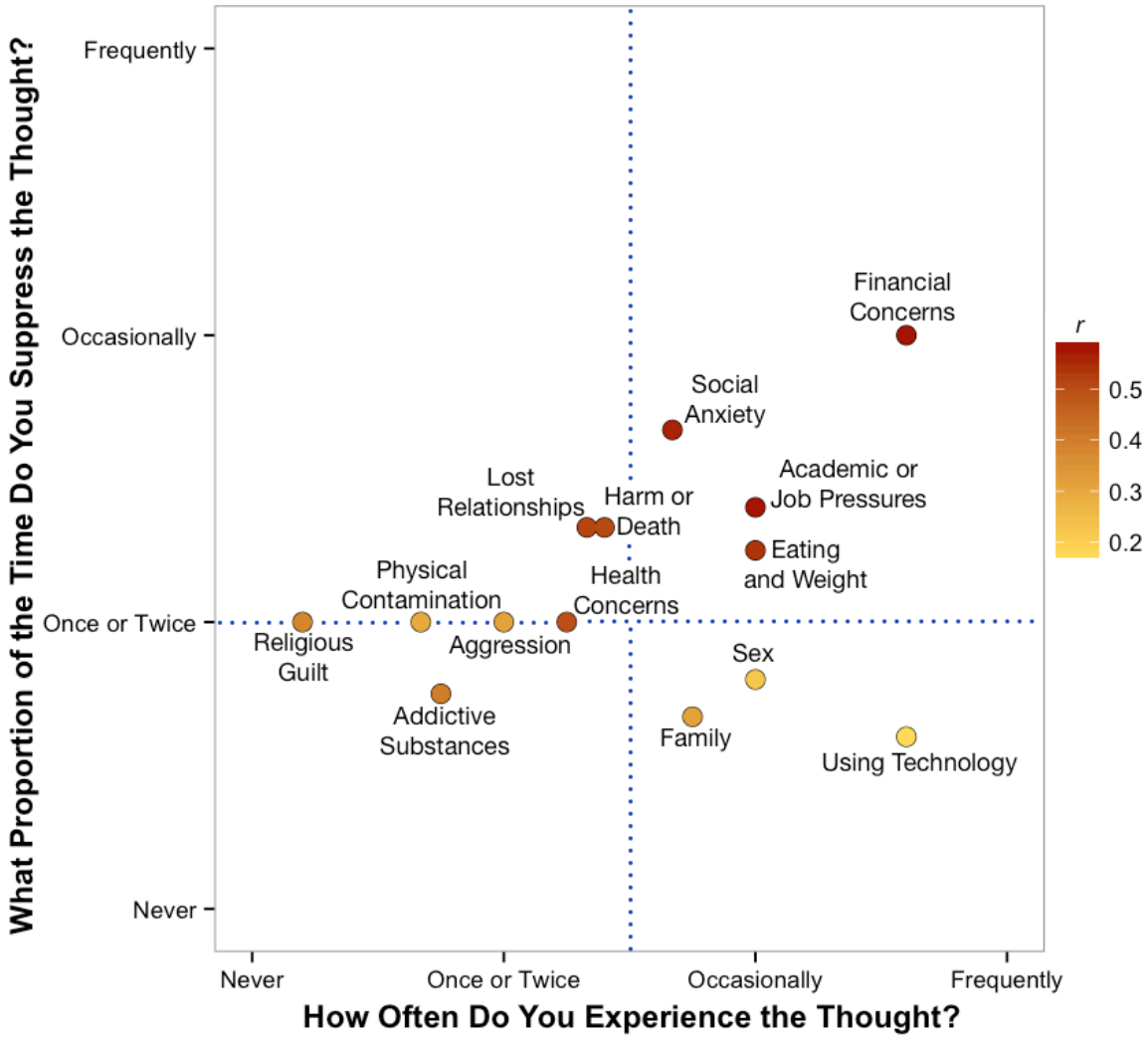


Figure 1. Median proportions of time with which thought categories are suppressed against median frequencies with which thought categories are experienced. Redder circles represent stronger correlations between the frequency of experience and proportion of time suppressed per thought category. The dotted vertical line represents the overall median frequency with which all thought categories are experienced. The dotted horizontal line represents the overall median proportion of time with which all thought categories are suppressed.

On average, all 14 thought categories are experienced or suppressed to some extent, but none are experienced constantly or suppressed every time they occur. In fact, of all the times a particular thought is experienced, the thought is at most "occasionally" suppressed on average (i.e., the thought category associated with financial concerns). Thus, although thought suppression is a strategy that non-clinical individuals commonly use in response to intrusive thoughts (Berry & Laskey, 2012; Freeston et al., 1991; Ladouceur et al., 2000), the present findings suggest that thought suppression is not invariably used whenever an unwanted thought is experienced.

When considering all 14 thought categories together, the correlation between the (log-transformed) median frequencies with which the thought categories are experienced and the (log-transformed) median proportions of time with which the thought categories are suppressed was not statistically significant, $r(12) = .22$, $p = .46$. The frequency with which thought categories *in general* are experienced is therefore not significantly related to the proportion of time with which they are suppressed, again suggesting that not all frequently experienced thoughts are suppressed whenever they occur and that not all rarely experienced thoughts are seldom suppressed.

Taken together, the 14 thought categories seem to vary along one or more dimensions, resulting in the observed range in correlation strengths when the thought categories were considered separately and the non-significant correlation when the thought categories were considered altogether. One speculation is that the proportion of time with which a thought is suppressed depends on both how often the thought is experienced as well as the valence of the thought. Frequently experienced thoughts that are negatively valenced are more likely categorized as intrusive and thus are more likely

to prompt suppression attempts whenever they occur. In contrast, frequently experienced yet positively valenced thoughts might not prompt suppression attempts as often, possibly because people welcome and revel in these thoughts. Although infrequent thoughts are more likely to go unnoticed, are less likely to be perceived as intrusive, and are therefore less likely to prompt effortful suppression each time they occur, it could be that even occasional occurrences of a particularly negative thought might be sufficient to make people suppress them each time they occur. In sum, the frequency with which a thought is experienced and the valence of the thought both influence the proportion of time with which a thought is suppressed.

In an attempt to examine whether the valences of the thought categories are related to their relative positions in Figure 1, the overall median frequency with which all thought categories are experienced (dotted vertical line) and the overall median proportion of time with which all thought categories are suppressed (dotted horizontal line) were used to divide the thought categories into four groups. The four groups separated the thought categories into: those that are experienced relatively frequently and usually suppressed when they occur (top right portion); those that are experienced relatively frequently but not usually suppressed when they occur (bottom right portion); those that are experienced relatively infrequently and rarely suppressed when they occur (bottom left portion); and those that are experienced relatively infrequently but usually suppressed when they occur (top left portion). The thought categories that occupy each portion will be discussed in turn.

Thought categories that occupy the top right portion include those associated with financial concerns, social anxiety, academic or job pressures, and eating and weight.

These thoughts are denotatively (i.e., running out of money) or connotatively (i.e., the amount of calories I eat) negative. It is therefore reasonable to expect these frequently occurring and negatively valenced thoughts to be suppressed for a large proportion of the time that they occur.

The bottom right portion includes thoughts associated with sex, family, and using technology. Despite the frequent occurrence of these thoughts, they are rarely suppressed, perhaps because the contents of these thoughts are not conclusively negative. Thoughts of checking your e-mail or Facebook, for instance, do not usually provoke strong negative reactions (and might instead stir positive anticipation), while thoughts of viewing porn or being sexually attracted to someone are likely perceived as exciting. Although thoughts of family problems are inherently negative and thus are likely to be avoided, thoughts of individual family members can be either positive or negative. Indeed, the frequencies with which thoughts of one's mother, father, and siblings occur were only weakly related to the proportions of time with which the corresponding thoughts are suppressed (r range: .08–.12; p range: .003–.07). In contrast, the frequency with which thoughts of family problems occur was more strongly and positively related to the proportion of time with which the corresponding thought is suppressed, $r(596) = .36$, $p < .001$. In general then, the thought categories that occupy the bottom right portion are those that are not necessarily negative or unwanted and therefore do not usually prompt suppression attempts despite their frequent occurrence.

The thought category of addictive substances was the only clear member of the bottom left portion. Thoughts of addictive substances might be applicable to a small proportion of people and thus, on average, are experienced relatively infrequently. For

people who do experience thoughts of addictive substances, these thoughts are not usually suppressed when they occur. While it could be that these thoughts are not usually suppressed because their infrequent occurrences make them seem less (or not) intrusive, a more probable reason is that people who do experience these thoughts are likely to give in to their vices rather than suppress them when they occur.

Although thought categories in the top left portion, which include those associated with harm or death as well as lost relationships, are not often experienced, they are clearly negative, and possibly more so than those in the top right portion. Thus, even though these thoughts are not often experienced, when they are, they are subject to suppression attempts most of the time.

Finally, the negatively valenced thoughts of health concerns, aggression, physical contamination, and religious guilt all lie to the left of the vertical line, indicating that they are not commonly experienced in general, but lie on the horizontal line, suggesting that these thoughts are suppressed to an average degree. If the proportion of time a thought is suppressed does depend on both the frequency with which the thought is experienced and the thought's valence, these rarely experienced thoughts would be expected to be suppressed for a good proportion of the time given their negative valence. They might not be suppressed as often as thoughts that are clearly in the bottom right portion, possibly because they are not as frequently experienced and/or because they are not as negatively valenced.

In sum, it appears that not all frequently occurring thoughts are invariably suppressed, and instead that it depends on the relative valence of the thought. While people are likely to use effortful escape/avoidance strategies against negatively valenced

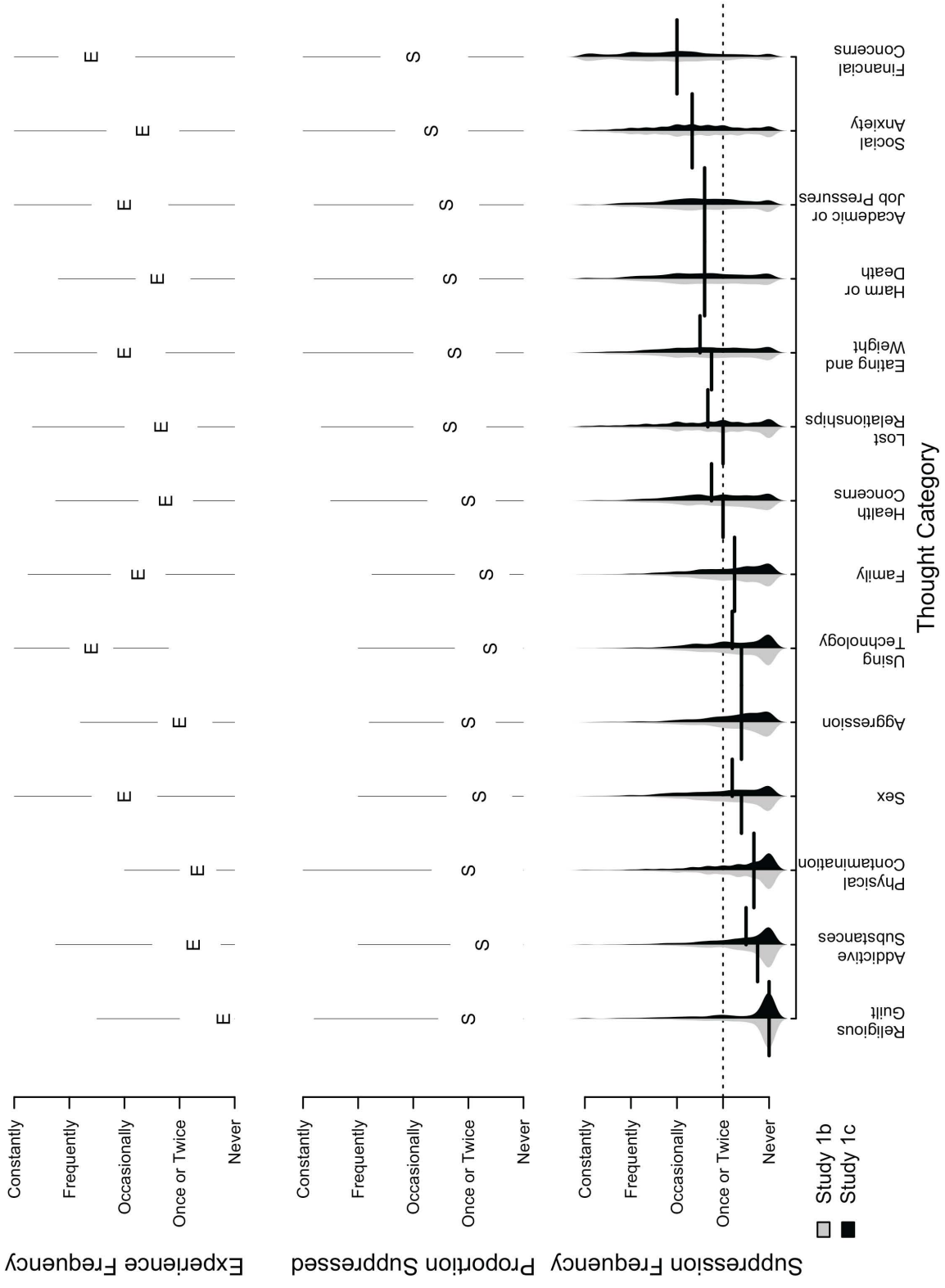
thoughts (Freeston et al., 1991), they are likely to indulge in positively valenced thoughts (see Edwards & Dickerson, 1987). Future research might consider assessing various attributes of each of the thoughts (e.g., valence, social acceptability) to identify the dimensions on which the thought categories differ, and to see whether these dimensions are related to the proportions of time with which the thoughts are suppressed.

Consistency of results across studies. Figure 2 illustrates the pattern of results obtained across studies. Again, subscale mean-scores were used as a common metric of comparison and medians were used as indicators of central tendency. For each of the 14 thought categories, there were three subscale mean-scores: one representing the mean frequency with which a thought category is experienced; one representing the mean proportion of time with which a thought category is suppressed; and one representing the mean frequency with which a thought category is suppressed.

The main goal was to examine whether the frequency with which each thought category is reportedly suppressed (i.e., the 60-item PETS subscale ratings) was simply a reflection of the frequency with which each thought category is reportedly experienced. First, the 60-item PETS subscale ratings (from Study 1b and Study 1c) were compared with ratings of how frequent each thought category is experienced (from Study 2) as well as ratings of the proportion of time with which each thought category is suppressed (from Study 2). Then, the 60-item PETS subscale ratings from Study 1b and Study 1c were compared.

Figure 2. Median subscale mean-scores for: frequency with which thought categories are experienced (top panel); proportion of time thought categories are suppressed (middle panel); and frequency with which thought categories are suppressed (bottom panel). Top and middle panels are box-and-whisker plots; letters (E and S) represent medians. Bottom panel compares the 60-item PETS scale beanplots from Study 1b and Study 1c; crossbars represent medians for each study; dotted line represents overall median value. Thought categories are ordered by median subscale mean-scores for Study 1b.

Figure 2 (Continued).



Frequency of experience, proportion of time suppressed, and PETS scale. The median frequencies with which the 14 thought categories are experienced were positively correlated with the median frequencies with which the corresponding thought categories are suppressed, $r(12) = .65$ for Study 1b and $r(12) = .68$ for Study 1c, $ps < .05$ for both. The positive associations make sense since it is reasonable to expect thoughts that are experienced more frequently to also be suppressed more frequently. Nevertheless, despite the strong associations, the trends of the medians in the top and bottom panels of Figure 2 do not exactly mirror each other. The medians in the top panel exhibit an overall increasing trend with local peaks and troughs whereas the medians in the bottom panel display a consistently increasing trend. These differences in the trends are reassuring as it demonstrates that when people complete the PETS scale, they are not simply using the frequency with which they experience each thought as a proxy for how often they suppress each thought.

In contrast, when people consider how often they suppress a thought out of all the times they've experienced the thought, their rating should very similar to their (PETS scale) rating of how often they suppress the thought. The median proportions of time with which the 14 thought categories are suppressed were positively correlated with the median frequencies with which the corresponding thought categories are suppressed, $r(12) = .83$ for Study 1b and $r(12) = .78$ for Study 1c, $ps < .01$ for both. In addition, the trends of the medians in the middle and bottom panels of Figure 2 suggest that both types of ratings from two largely distinct samples were similar. For both, the median ratings showed a consistently increasing trend.

PETS scale across studies. The similarities of the PETS subscale ratings across Study 1b and Study 1c were examined in two ways. First, the relative positions of the thought categories across studies when ordered by their median ratings were compared. Next, differences in absolute PETS subscale ratings across studies were assessed.

Across Study 1b and Study 1c, the relative frequencies with which the 14 thought categories are suppressed were generally similar in trend. For both studies, the three most rarely suppressed thought categories were those associated with religious guilt, addictive substances, and physical contamination, while the four most frequently suppressed thought categories were those associated with harm and death befalling loved ones or self, academic or job pressures, social anxiety, and financial concerns. The median ratings across studies were positively and strongly correlated with each other, $r(12) = .97$, $p < .001$.

To assess whether the absolute frequencies with which the 14 thought categories are suppressed differed between Study 1b and Study 1c, a series of *t*-tests were conducted on the log-transformed subscale mean-scores. False Discovery Rate (FDR; Benjamini & Hochberg, 1995) corrections were applied to correct for multiple comparisons. In general, the PETS subscale ratings for Study 1c were higher than those for Study 1b (FDR cutoff: $p \leq .009$). People in Study 1c reported suppressing thoughts of religious guilt, harm and death befalling loved ones or self, using technology, sex, aggression, health concerns, lost relationships, and additive substances more often than people in Study 1b, *t* range: 2.61–5.54, *r* range: .07–.14. As noted previously, the samples in Study 1b and Study 1c were largely independent; out of the total 810 MTurk Workers recruited in Study 1c, at most 43 (5.3%) also participated in Study 1b. The differences in the

absolute frequencies might therefore be attributed to differences in sample characteristics. Although MTurk Workers in Study 1b and Study 1c did not differ in age ($p = .28$) or sex ($p = .39$), it could be that they differed on other attributes that were not assessed such as levels of subclinical psychopathology. Differing levels of subclinical psychopathology across samples could have resulted in differences in thought suppression profiles. This possibility was pursued in the final study.

Study 3: Subclinical Thought Suppression Profiles

How do levels of subclinical psychopathology relate to the frequencies with which the various thought categories are suppressed? Do people form distinct clusters based on their thought suppression profiles? In this final study, the relationship between levels of subclinical psychopathology and thought suppression profiles was examined. A sample of MTurk Workers rated the frequency with which they suppressed 69 target thoughts during the past month and completed measures of depression, anxiety, worry, obsessive-compulsive distress, and psychopathy. Degree of socially desirable response bias was also assessed.

Participants

The sample of MTurk Workers consisted of 1,201 individuals. Workers were compensated with $0.90 on successful completion of the HIT. Individuals who did not respond correctly or who did not respond at all to the IMC (26%) were excluded. There were no significant differences between those included versus excluded on race. Those who were excluded (M = 31.1 years, SD = 10.7) were younger than those included (M = 32.8, SD = 11.3), $t(1,199) = 2.23$, $p = .03$, $r = .06$. Fewer females were excluded than expected whereas more males were excluded than expected, $\chi^2(2, N = 1,186) = 12.5$, $p = .002$. These differences were generally small, so were not a serious concern in the present study.

Mean age of the final sample (N = 888; 426 female, 451 male, 2 Other, 9 not reporting sex) was 32.8 years (SD = 11.3; range: 19–75). Of those who indicated race, 79.8% were White, 6.2% Asian or Asian American, 5.6% African American, 3.2% Hispanic, 0.6% Native American, 0.2% Native Hawaiian or Pacific Islander, 5.3%

Multiracial, and 0.5% self-reported as Other. All participants were from the United States.

Of the 1,201 MTurk Workers who participated in Study 3, there were 45 who also participated in Study 1a, 48 in Study 1b, 88 in Study 1c, and 96 in Study 2. As before, it could not be ascertained which of the MTurk Workers were excluded from analyses.

Procedure

The study was hosted on Qualtrics. After providing informed consent and demographic information, participants rated how often they tried not to think about 69 target thoughts during the past month. Next, participants completed scales assessing levels of depression, anxiety, worry, obsessions, and psychopathy as well as the 20-item Social Desirability Scale (SDS; Strahan & Gerbasi, 1972). The order of presentation of these scales was counterbalanced across participants. Finally, participants responded to an IMC, were thanked, and debriefed.

Measures

Frequency of suppressing target thoughts. Of the 69 target thoughts, 60 were from the 60-item PETS scale. The remaining 9 items (see Appendix D) were those that had initially been removed in Study 1a and Study 1b when a principal-components analysis with varimax rotation was conducted—when a PAF with promax rotation was conducted instead, results suggested that these items related to accidents and self-deprecation could have been retained (see Footnote 1).

First, general instructions were presented on a single page: “In the next section, you will be presented with a list of thoughts. For each thought, indicate how often you have tried NOT to think about the thought during the PAST MONTH. That is, indicate

how often you have tried to push the thought out of your mind during the past month." On the next page, the following prompt was presented, "Sometimes people try not to think about things. For example, people might try to push away thoughts of nightmares or their past lovers. How often have you TRIED NOT to think about each of the following during the PAST MONTH?" Participants indicated, using a 5-point scale (*never*, *once or twice*, *occasionally*, *frequently*, *constantly*), how often they suppressed each of the 69 target thoughts during the past month. The order of all items was randomized for each participant.

The instructions for the PETS scale in this study differed from the instructions in Study 1b and Study 1c in that MTurk Workers in this study were given an explicit time frame. In general though, the solution for a PAF with promax rotation of the 60 ratings was similar to the solutions obtained in Study 1b and Study 1c. Specifically, the PAF with promax rotation yielded a 13-factor solution (all initial eigenvalues > 1) accounting for 59% of the common variance. The 13 factors corresponded to the following target thought categories: financial concerns; harm or death; religious guilt; sex; academic or job pressures; aggression; health concerns; social anxiety; lost relationships; eating and weight; family; addictive substances; and using technology. The physical contamination items (*images of insects*; *bodily wastes*; *dirt or germs on things*) should have constituted a 14^{th} factor but instead loaded on either the aggression factor or the health concerns factor. Nevertheless, when the extraction of 14 factors was specified, the solution produced the same 14 thought categories as that listed in Table 1. All items had primary loadings > .35 and cross-loadings < .25. The means of the total 60-items PETS scale and means of the 14 subscales across studies were also largely consistent (see Appendix E).

A 16-factor solution was expected for the factor analysis of all 69 ratings because of the addition of the accidents and self-deprecation thought categories. A PAF with promax rotation of the 69 ratings yielded a 14-factor solution (all initial eigenvalues > 1) accounting for 59% of the common variance. There were two factors fewer than expected because the thought category of harm or death and the thought category of family merged into a single category as did the physical contamination and accidents thought categories. All items (except for one item) had primary loadings > .30 and cross-loadings < .30.

The 16 categories were treated separately in all analyses. The reliabilities of the 16 factors were good (Cronbach's α = .68–.93).

Depression, anxiety, and worry. Levels of depression and anxiety were assessed using the corresponding scales of the Depression Anxiety Stress Scales (DASS; S. H. Lovibond & P. F. Lovibond, 1995). The DASS was constructed through successive factor analyses and items with cross-loadings > .25 were not retained to minimize the overlap among constructs. The depression and anxiety scales consist of 14 items each, and participants rate (0 = *Did not apply to me at all*; 3 = *Applied to me very much, or most of the time*) the extent to which each statement (e.g., "I felt down-hearted and blue"; "I felt scared without any good reason") applied to them over the past week.

In the present study, participants rated the extent to which each statement applied to them over the past month (as was the case for all other scales). The reliabilities of the depression (Cronbach's α = .96) and anxiety (Cronbach's α = .93) scales were high.

Since the DASS does not specifically assess levels of chronic worry, the Penn State Worry Questionnaire (PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) was

administered to measure the general tendency to worry. The PSWQ includes 16 statements (e.g., "I am always worrying about something") and participants rated (1 = *Not at all typical of me*; 5 = *Very typical of me*) the extent to which each statement was descriptive of them. The reliability of the scale was high (Cronbach's α = .95).

Obsessive-compulsive distress. Levels of obsessive-compulsive distress were assessed using the 18-item Obsessive-Compulsive Inventory-Revised (OCI-R; Foa et al., 2002). Each item describes an experience related to obsessing (e.g., "I find it difficult to control my thoughts"), washing (e.g., "I wash my hands more often, or for longer than necessary"), checking (e.g., "I check things more often than necessary"), ordering (e.g., "I get upset if objects are not arranged properly"), hoarding (e.g., "I avoid throwing things away because I am afraid I might need them later"), and neutralizing (e.g., "I feel that there are good and bad numbers"). Participants rated (0 = *Not at all*; 4 = *Extremely*) how much each experience had distressed or bothered them during the past month. The reliabilities of the obsessing (Cronbach's α = .88), washing (Cronbach's α = .84), checking (Cronbach's α = .78), ordering (Cronbach's α = .88), hoarding (Cronbach's α = .79), and neutralizing (Cronbach's α = .80) scales were good.

Psychopathy. Levels of psychopathy were assessed using the Self-Report Psychopathy scale (SRP-III; Paulhus, Hemphill, & Hare, 2009). Because of confidentiality concerns, the antisocial/criminal behavior subscale (16 items) was not administered. The remaining 48 items were related to interpersonal manipulation (e.g., "A lot of people are "suckers" and can easily be fooled."), callous affect (e.g., "I never feel guilty over hurting others."), and erratic lifestyle (e.g., "I enjoy doing wild things."). Participants rated (1 = *Disagree strongly*; 5 = *Agree strongly*) the degree to which they

agreed with each statement. The reliabilities of the interpersonal manipulation (Cronbach's α = .86), callous affect (Cronbach's α = .80), and erratic lifestyle (Cronbach's α = .81) subscales were high.

Socially desirable response bias. The tendency to respond in a socially desirable manner was assessed with the 20-item Social Desirability Scale (Strahan & Gerbasi, 1972). Participants rated each of the items (e.g., "I have never intensely disliked anyone") as True or False. The reliability of the scale (Kuder-Richardson formula 20 = .77) was good.

Instructional Manipulation Check. To ensure that the Instructional Manipulation Check (IMC; Oppenheimer et al., 2009) served its purpose (especially for repeat responders), the IMC was made less conspicuous among the other scales that were much longer in length by presenting two short filler questions immediately before the IMC. Specifically, participants were asked to indicate their geographic location as well as their political orientation. For the IMC, participants were presented with the following prompt:

> *Listed below are several online shopping sites. Which do you use most often?*
>
> *Studies show that people prefer to minimize their effort as much as possible when reading questions. If you are reading this question and have read all the other questions, please select the response option 'Other' and type 'I read the questions.' in the box below. Thank you for taking the time to read through the questions carefully.*

The response options included: *Amazon.com*, *Ebay.com*, *Zappos.com*, and *Other*.

Results and Discussion

Table 6 presents the descriptive statistics for each of the study measures. The distribution of the 69-item PETS scale total scores exhibited a moderate positive skew while the distributions of the subscale scores were either moderately or strongly positively skewed. Thus, the 69-item PETS scale total scores were subjected to square-root transformations and all subscale scores were subjected to log transformations to allow for consistent interpretations across subscales. Since the distributions of scores for the DASS scales and OCI-R subscales were positively skewed, square-root transformations were applied.

Table 6

Descriptive Statistics of Study Measures

Measure	*M* (*SD*)	*Mdn*	Range		Skew
			Potential	Actual	
PETS Scale: 69 Items	70 (42)	66	0–276	0–206	0.60
DASS: Depression	13 (11)	9	0–42	0–42	0.78
DASS: Anxiety	8 (9)	5	0–42	0–40	1.20
PSWQ: Worry	50 (16)	52	16–80	16–80	-0.12
OCI-R: Total	15 (13)	11	0–72	0–67	1.16
OCI-R: Obsessing	3 (3)	2	0–12	0–12	1.04
OCI-R: Washing	2 (3)	0	0–12	0–12	1.75
OCI-R: Checking	3 (3)	2	0–12	0–12	1.14
OCI-R: Ordering	3 (3)	3	0–12	0–12	0.84
OCI-R: Hoarding	3 (3)	3	0–12	0–12	0.85
OCI-R: Neutralizing	2 (2)	0	0–12	0–12	1.87
SRP-III: Total	8 (2)	8	3–15	4–13	0.06
SRP-III: Interpersonal Manipulation	3 (1)	3	1–5	1–5	0.18
SRP-III: Callous Affect	2 (1)	2	1–5	1–4	0.25
SRP-III: Erratic Lifestyle	3 (1)	3	1–5	1–5	0.06
SDS	9 (4)	9	0–20	0–20	0.12

Note. PETS = Profiles of Everyday Thought Suppression scale; DASS = Depression Anxiety Stress Scales; PSWQ = Penn State Worry Questionnaire; OCI-R = Obsessive-Compulsive Inventory-Revised; SRP-III = Self-Report Psychopathy scale; SDS = Social Desirability Scale. In the present study, the total score for the SRP-III was based on only three of the four subscales.

Four main analyses were conducted. First, the 69-item PETS scale and the 16 PETS subscales were correlated with each of the psychopathological indicator scales and their respective subscales. For this set of analyses, each psychopathological indicator was considered separately. Bivariate correlations were conducted, and then the analyses were repeated with the effect of social desirability on the PETS (sub)scale partialed out. Second, a series of simultaneous multiple regression analyses were carried out. The 69-item PETS scale was regressed onto the total scores for depression, anxiety, worry, obsessive-compulsive distress, and psychopathy. Similarly, each of the 16 thought category subscales was regressed onto these five total scores. Third, a canonical correlation analysis was conducted to evaluate whether there were any dimensions along which the set of psychopathological indicators were related to the set of thought category subscales. Finally, a cluster analysis was performed to examine whether people formed distinct clusters based on their responses on the 69-item PETS scale. The stability of the cluster groupings was assessed and the thought suppression profiles that characterized these clusters were examined. A multivariate analysis of variance was then conducted to evaluate differences in levels of subclinical psychopathology among these clusters.

Psychopathological indicators considered separately. The correlations between the 69-item PETS scale (total and subscales) and levels of depression, anxiety, and worry are presented in Figure 3 and Figure 4. All correlations were positive and held even after controlling for the tendency to respond in a socially desirable manner. This suggested that people reporting higher levels of depression and anxiety over the past month and a higher tendency to worry in general were more likely to frequently suppress all thought categories over the past month.

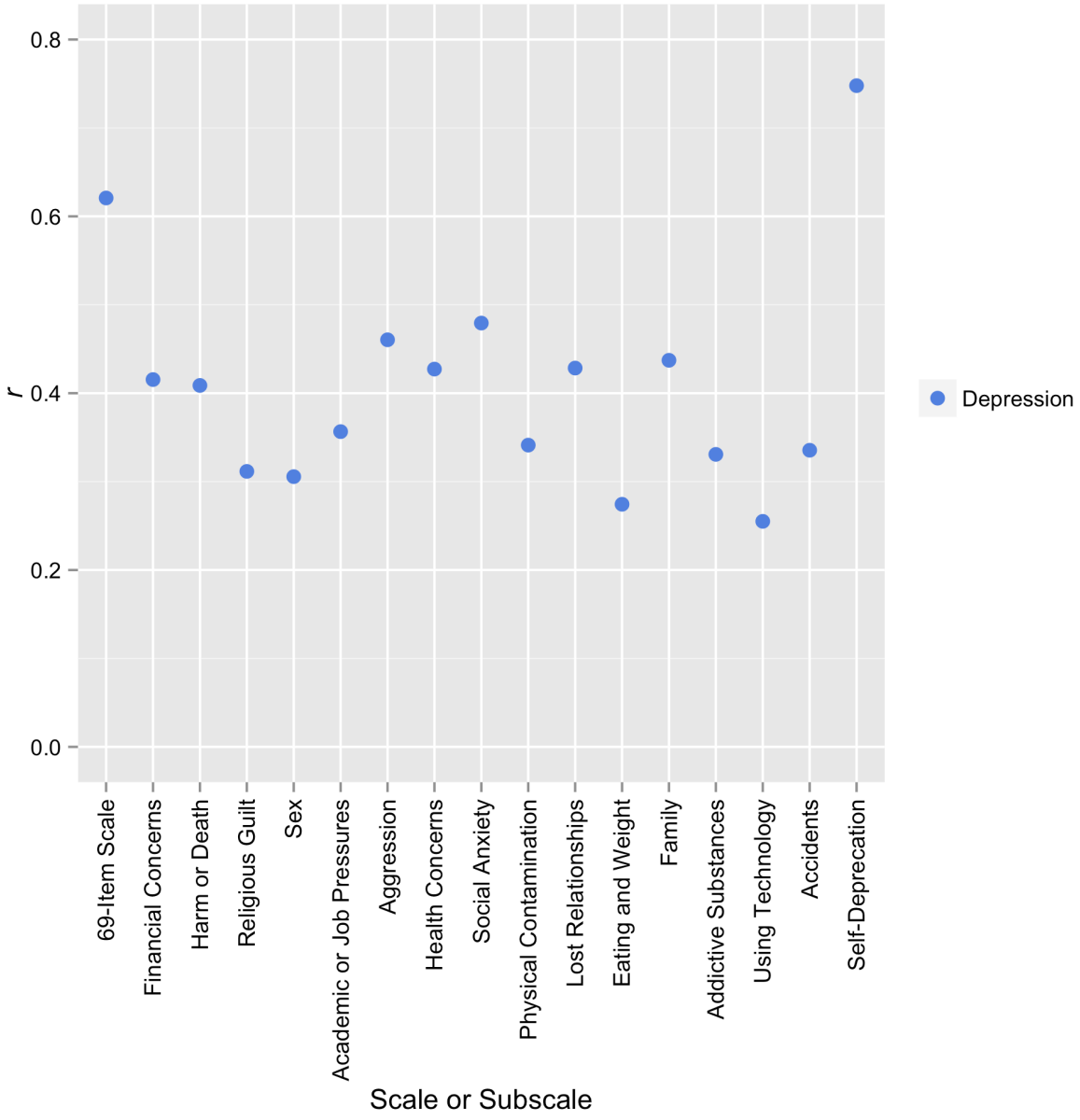


Figure 3. Bivariate correlations between the 69-item PETS scale ratings and levels of depression. All *p*s < .001.

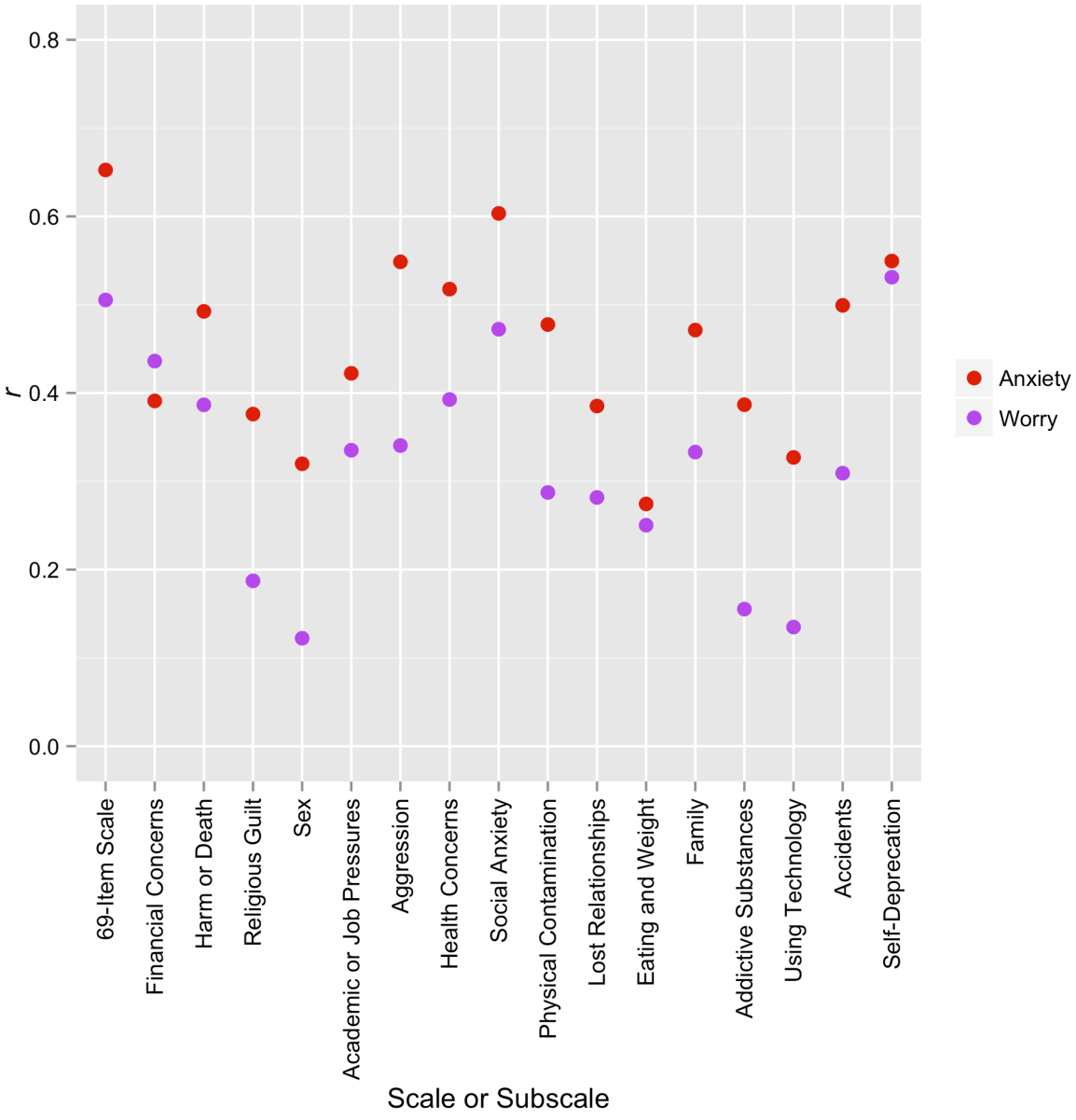


Figure 4. Bivariate correlations between the 69-item PETS scale ratings and levels of anxiety and worry. All *p*s < .001.

The correlations between the 69-item PETS scale (total and subscales) and levels of obsessions and compulsions are presented in Figure 5. Again, all positive correlations held after controlling for the tendency to respond in a socially desirable manner. People

reporting higher levels of obsessive-compulsive distress and obsessing over the past month were more likely to frequently suppress all thought categories over the past month.

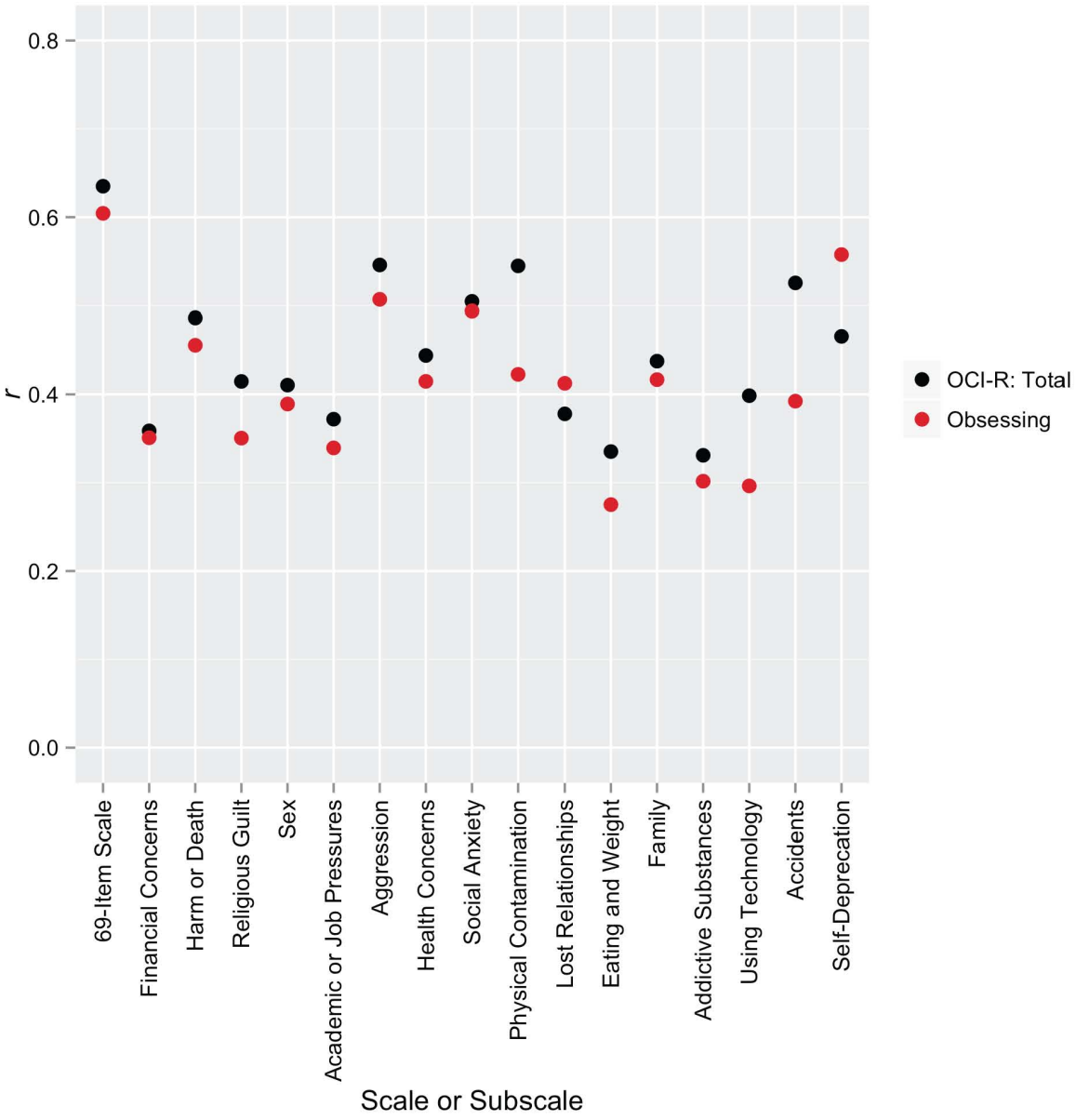


Figure 5. Bivariate correlations between the 69-item PETS scale ratings and levels of overall obsessive-compulsive distress and obsessing. All *p*s < .001.

The correlations between the 69-item PETS scale (total and subscales) and levels of psychopathy are presented in Figure 6. Although all correlations were positive, they were generally weaker (mean *r* for SRP-III: Total = .17) than those between the PETS scale and levels of depression (mean *r* = .41), anxiety (mean *r* = .45), worry (mean *r* = .32), overall obsessive-compulsive distress (mean *r* = .45), and obsessing (mean *r* = .41). These results are in line with predictions and therefore provide support for the discriminant validity of the PETS scale.

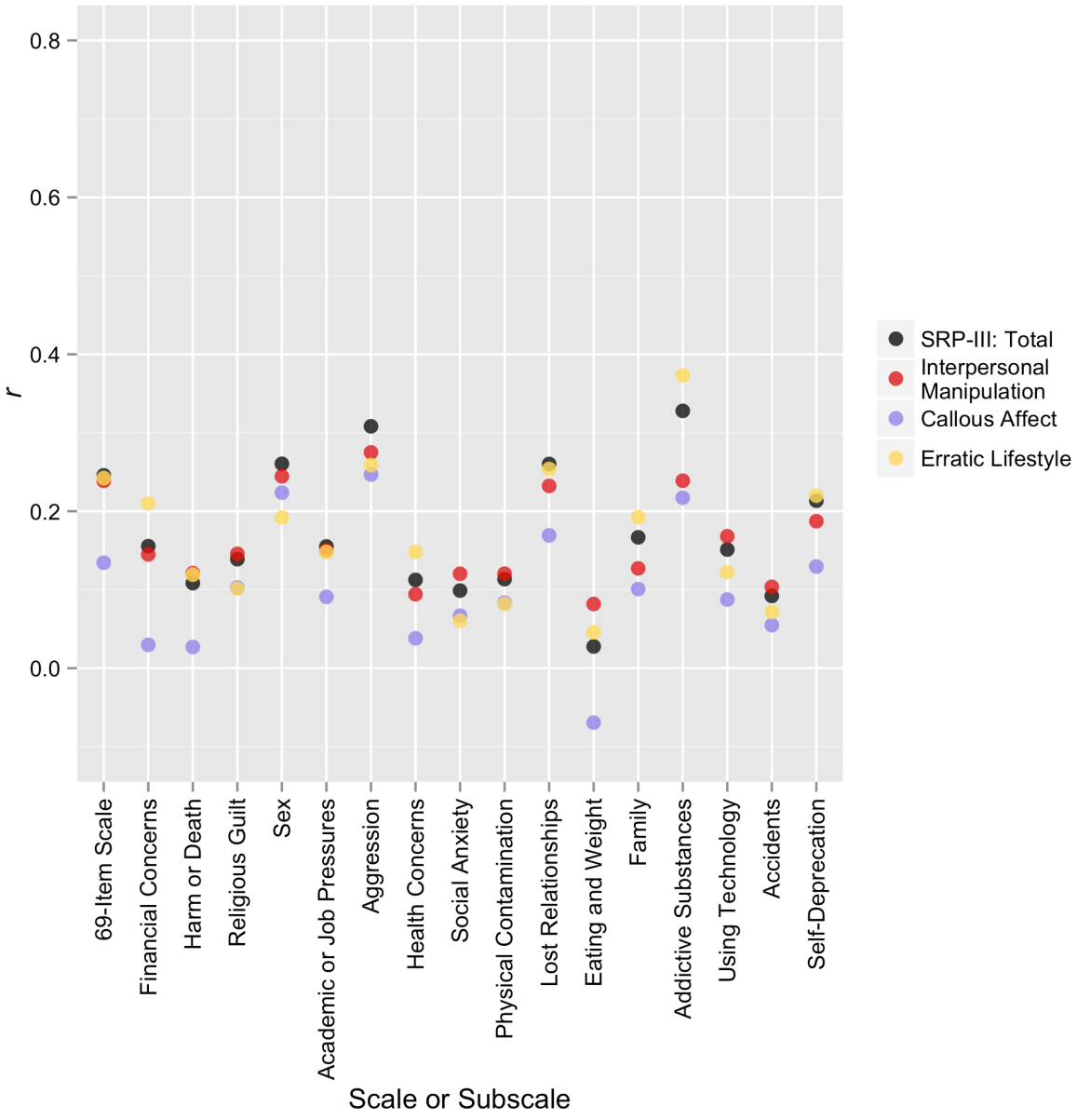


Figure 6. Bivariate correlations between the 69-item PETS scale ratings and levels of overall psychopathy, interpersonal manipulation, callous affect, and erratic lifestyle.

Psychopathological indicators considered simultaneously. The 69-item PETS scale and the 16 subscales were each simultaneously regressed on the total scores for depression, anxiety, worry, obsessive-compulsive distress, and psychopathy. Figure 7 provides a graphical representation of the beta coefficients.

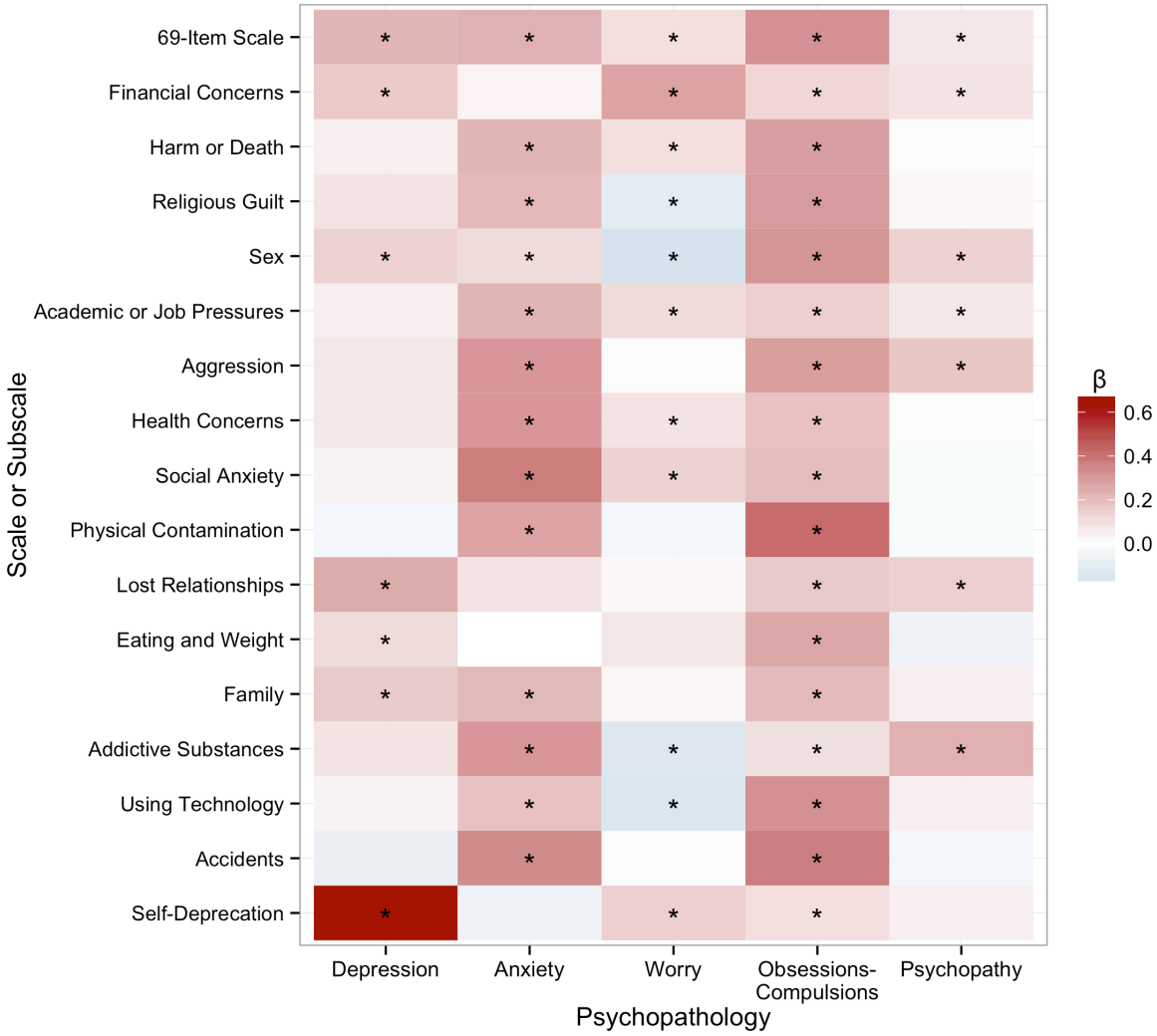


Figure 7. Beta coefficients for the simultaneous regressions of the 69-item PETS scale ratings on depression, anxiety, worry, obsessive-compulsive distress, and psychopathy. Coefficients ≤ FDR cutoff (= .03) are flagged with asterisks. Redder tiles specify more heavily weighted positive predictors and bluer tiles specify more heavily weighted negative predictors.

When the 69 items were considered altogether (first row of tiles of Figure 7), higher levels of one psychopathological indicator were associated with more frequent suppression of all thought categories, even after controlling for the effects of the other four psychopathological indicators. This was true for depression, anxiety, worry, obsessions-compulsions, and psychopathy. To get an overall picture of the relationship between each psychopathological indicator and the frequency of suppressing the various thoughts categories, each of the five columns of tiles will be examined successively.

After controlling for the effects of the other psychopathological indicators, levels of depression predicted the frequency of suppressing thoughts related to self-deprecation ($\beta = .65$), lost relationships ($\beta = .25$), family ($\beta = .16$), financial concerns ($\beta = .15$), sex ($\beta = .13$), and eating and weight ($\beta = .11$). These positive relationships are in line with depressive cognitions being predominantly concerned with past personal losses and failures in interpersonal and achievement domains as well as the association between (mild) depression and an increase in sexual desire (e.g., Frohlich & Meston, 2002). The suppression of thoughts related to eating and weight can be understood in light of the association between depression and disturbances in appetite (e.g., Paykel, 1977), although the small magnitude of the beta coefficient suggests that depression does not uniquely contribute much to the frequency of suppressing such thoughts.

Higher levels of anxiety were associated with the frequent suppression of the majority of thought categories, even after controlling for the effects of the other psychopathological indicators. The redder tiles corresponded to thoughts related to social anxiety ($\beta = .38$), accidents ($\beta = .34$), health concerns ($\beta = .31$), aggression ($\beta = .31$), and addictive substances ($\beta = .31$). The relationship between anxiety and the suppression of

thoughts related to social anxiety, accidents, and health concerns is clear, the latter two being in line with the main theme of anxious cognitions—potential physical or psychological harm. The suppression of thoughts related to aggression and addictive substances might be attributable to the tendency for certain socially anxious individuals to engage in risky, disinhibited behaviors (see Kashdan & McKnight, 2010) as well as to the association between high trait anxiety and coping motives for alcohol, cigarette, and marijuana use (e.g., Comeau, Stewart, & Loba, 2001; Stewart & Zeitlin, 1995).

Similarly, higher levels of worry were associated with the frequent suppression of most thought categories. In comparison to the global measure of anxiety, the magnitudes of the beta coefficients for the specific measure of worry were lower (absolute β range: 0.09–0.27). This was expected given that the global measure of anxiety and the specific measure of worry were both indicators of anxiety and are therefore highly related constructs. Consequently, in a given regression model, one of the two measures will be given a more significant weight. Nevertheless, people reporting higher levels of trait worry were likely to suppress thoughts related to financial concerns (β = .27). Although people reporting higher levels of trait worry were also less likely to suppress thoughts related to sex (β = -.16), using technology (β = -.14), addictive substances (β = -.13), and religious guilt (β = -.12), the magnitude of the beta coefficients were relatively small, suggesting that worry is not as important a contributor to the frequency of suppressing these thoughts as are other psychopathological indicators.

As expected, higher levels of obsessive-compulsive distress were associated with the frequent suppression of all thought categories, even after controlling for the effects of the other psychopathological indicators. The redder tiles corresponded to thoughts

related to physical contamination (β = .42), accidents (β = .37), and sex (β = .31), thought categories considered the most upsetting and frequent intrusive thoughts in nonclinical individuals (Berry & Laskey, 2012).

Finally, higher levels of psychopathy were related to more frequent suppression of thoughts related to financial concerns, sex, academic or job pressures, aggression, lost relationships, and addictive substances. In general, though, the beta coefficients were of lower magnitude than those for other psychopathologies (β range: 0.07–0.23). This suggested that psychopathy, as expected, does not uniquely contribute as much to the prediction of the suppression frequencies of the various thought categories as the other psychopathological indicators.

In sum, each psychopathological indicator was related to the frequency of suppressing the various types of thought categories. The series of multiple regressions, however, do not provide an accurate picture. The psychopathological indicators are not all independent of each other, and similarly, the suppression frequencies of the various thoughts categories are not uncorrelated with each other. The next analysis therefore explores whether the set of five psychopathological indicators taken together were related along any dimensions to the suppression frequencies of the set of 16 thought categories, also considered altogether.

Correlating the set of psychopathological indicators with the set of target thoughts. A canonical correlation analysis was carried out between the set of psychopathological indicators and the set of 16 thought categories using the CCA package in R (González, Déjean, Martin, & Baccini, 2008). Before delving into the results, a brief description of the terms used below is in order. A canonical correlation

analysis is concerned with two sets of variables, a predictor set (i.e., the five psychopathological indicators) and a criterion set (i.e., the suppression frequencies of the 16 thought categories). Canonical variates refer to linear combinations of these variables and can be treated as a type of latent variable. Canonical variates come in pairs with one linear combination on the predictor (i.e., psychopathological indicator) side and one linear combination on the criterion (i.e., thought categories) side. To measure the degree of association between a pair of canonical variates, canonical correlations are computed. Each pair of canonical variates is referred to as a canonical dimension, which is analogous to a factor obtained in factor analysis. The number of canonical dimensions is equal to the number of variables in the smaller set (i.e., number of variables in the psychopathological indicator set = 5), but the number of significant dimensions can be smaller.

Number of canonical dimensions. Significance tests of the canonical dimensions in the current study indicated that all five dimensions were significant, $F(80, 4{,}173.2) = 24.08$, $p < .001$. This suggests that there is significant overlap in variability between the set of psychopathological indicators and the frequency with which the set of thought categories are suppressed. With the first canonical dimension removed, there was still a significant relationship between the two sets of variables, $F(60, 3{,}386.6) = 12.93$, $p < .001$. Similarly, when the second, third, and fourth canonical dimensions were successively removed, there was still a significant relationship between the two sets of variables, F range: 3.31–8.00, all ps $< .001$. Thus, all five pairs of canonical variates accounted for the significant relationships between the two sets of variables.

The first canonical correlation was .80 (representing 64% overlapping variance between the first pair of canonical variates); the second was .60 (36% overlapping variance for the second pair); the third was .44 (19% overlapping variance for the third pair); the fourth was .32 (10% overlapping variance for the fourth pair); and the fifth was .21 (.04% overlapping variance for the final pair). Since there was < 10% in overlapping variance between the fifth pair of canonical variates, only the first four pairs will be interpreted (cf. Tabachnick & Fidell, 2007).

Proportion of variance canonical variates extract from variables. To assess the amount of variance accounted for by the canonical variates, two types of variance overlap were examined: the amount of variance a variate extracts from its own set of variables as well as the amount of variance a variate extracts from the other set of variables (i.e., redundancies). Table 7 presents the proportion of variance accounted for by each variate and the corresponding redundancies. Since the variates are orthogonal to each other, summing across the columns indicates that all four variates from the psychopathological indicator side account for 92% of the variance in the psychopathological indicators whereas all four variates from the thought categories side account for 57% of the variance in the suppression frequencies of the thought categories. With respect to the total redundancies—which are essentially the amount of common variance between the two sets of variables—the four variates from the psychopathological indicator side explain 43% of the variance in the suppression frequencies of the thought categories whereas the four variates from the thought categories side account for 29% of the variance in the psychopathological indicators.

Interpretation of canonical dimensions. Canonical dimensions can be interpreted by inspecting the standardized canonical coefficients or the canonical loadings. Standardized canonical coefficients are similar to standardized regression coefficients while canonical loadings are correlations between the variables and its corresponding canonical variates.

Table 7 presents the standardized canonical coefficients for each variable and its corresponding canonical variate. The magnitude of the coefficient reflects the variable's relative contribution to its corresponding variate. For instance, one standard deviation increase in (square-root of) depression is associated with a 1.19 decrease in the score of the second canonical variate for the psychopathological indicator set, with all other variables held constant. In contrast, one standard deviation increase in psychopathy is associated with only a .05 decrease in the score of the same canonical variate, with all other variables held constant. Standardized canonical coefficients, however, should be interpreted cautiously because they tend to be unstable, especially if multicollinearity is present (cf. Weiss, 1972). Therefore, more weight should be put on the interpretation of the canonical loadings instead.

Table 7

Standardized Canonical Coefficients between Variables and their Corresponding Canonical Variates, Proportion of Variance Explained by the Canonical Variates, and Redundancies of the Canonical Variates

	CV1	CV2	CV3	CV4
Psychopathological Indicator Set				
Depression (square-root)	-0.47	-1.19	0.29	0.65
Anxiety (square-root)	-0.25	0.90	-0.01	-0.84
Worry	-0.16	-0.21	-0.81	-0.54
Obsessions-Compulsions (square-root)	-0.28	0.60	0.13	0.95
Psychopathy	-0.09	-0.05	0.68	-0.64
Proportion of Variance	.56	.09	.18	.09
Redundancy	.36	.03	.03	.01
Thought Category Set (all log-transformed)				
Financial Concerns	-0.08	0.06	-0.22	-0.31
Harm or Death	-0.08	0.09	-0.12	0.03
Religious Guilt	-0.04	0.12	0.06	0.20
Sex	0.01	0.01	0.45	0.31
Academic or Job Pressures	-0.06	0.07	-0.12	-0.43
Aggression	-0.15	0.20	0.33	-0.40
Health Concerns	-0.09	0.09	-0.23	-0.24
Social Anxiety	-0.20	0.38	-0.49	-0.38
Physical Contamination	-0.11	0.26	-0.06	0.45
Lost Relationships	-0.06	-0.03	0.21	-0.13
Eating and Weight	0.10	-0.07	-0.18	0.39
Family	0.00	-0.12	0.03	0.09
Addictive Substances	-0.04	0.00	0.55	-0.48
Using Technology	0.02	0.14	0.16	0.31
Accidents	-0.01	0.32	-0.16	0.23
Self-Deprecation	-0.51	-1.09	0.02	0.48
Proportion of Variance	.38	.08	.06	.05
Redundancy	.24	.03	.01	.005

Note. CV = Canonical Variate; Proportion of Variance = proportion of variance each canonical variate extracts from variables from its own side; Redundancy = proportion of variance each canonical variate extracts from variables from the other side.

Figure 8 presents the canonical loadings for each of the four canonical dimensions. An absolute correlation ≥ .30 (9% overlapping variance) was used as a cutoff for determining whether a variable was a significant part of a variate (cf. Tabachnick & Fidell, 2007).

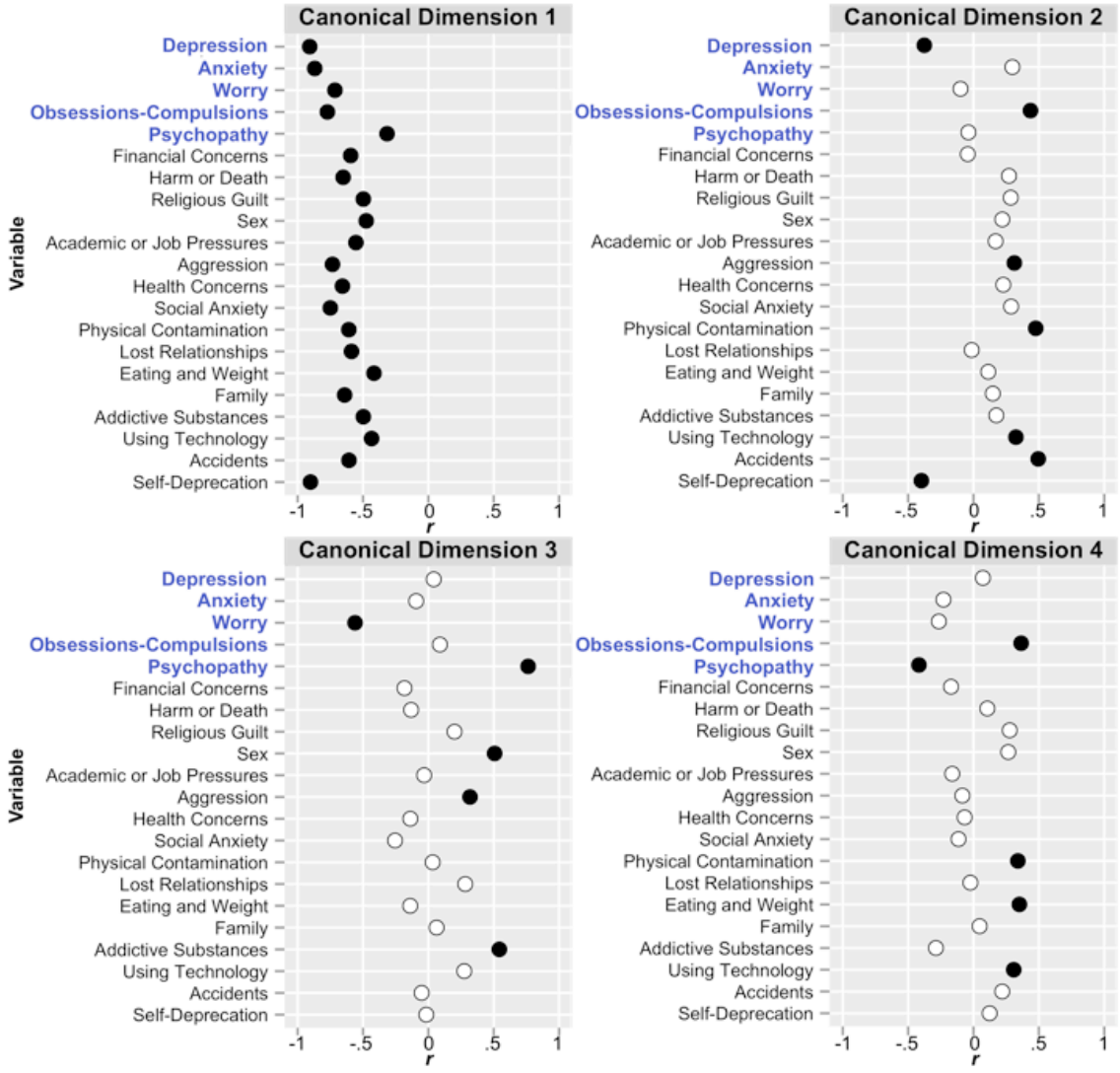


Figure 8. Correlations between variables and their corresponding canonical variates for each of the four canonical dimensions. Black circles correspond to correlations ≥ .30 or ≤ -.30 and white circles correspond to correlations within this range.

The first canonical dimension was negatively correlated with all variables from the psychopathological indicator set and negatively correlated with all variables from the thought categories set. Put another way, levels of subclinical psychopathology were positively associated with the suppression frequencies of all thought categories. This first dimension appeared to reflect a higher-order (low) negative affect dimension since higher scores on this dimension were associated with fewer subclinical symptoms of psychopathology and less frequent suppression of all thought categories over the past month. While this dimension showed that greater negative affect is associated with more frequent thought suppression in general, the other dimensions suggested that certain indicators of psychopathology were more strongly associated with the suppression of certain thought categories than others. These dimensions are discussed in turn.

The second canonical dimension was composed of (square-root of) depression and (square-root of) obsessive-compulsive distress from the psychopathological indicator set and (log of) the frequency of suppressing thoughts related to aggression, physical contamination, using technology, accidents, and self-deprecation. A combination of lower levels of depression (r = -.38) and higher levels of obsessive-compulsive distress (r = .44) over the past month were associated with more frequent suppression of thoughts related to aggression (r = .31), physical contamination (r = .48), using technology (r = .32), and accidents (r = .50) but less frequent suppression of thoughts related to self-deprecation (r = -.40) over the past month.

The association between high levels of obsessive-compulsive distress and the suppression of thoughts related to physical contamination, accidents, and aggression is apparent; these thought categories are regarded as the most upsetting and frequent

intrusive thoughts in nonclinical and clinical individuals (Berry & Laskey, 2012). In comparison, the association between high levels of obsessive-compulsive distress and the suppression of thoughts related to using technology is less clear at first. However, given that three of the five items in this subscale are concerned with checking behaviors broadly defined, it could be that people who experienced high levels of compulsions in the past month tried to suppress thoughts of checking their phone, e-mail, and social networking sites more often. Thoughts of self-deprecation were less likely to be suppressed, perhaps because self-deprecating thoughts are experienced (and thus suppressed) only during periods of high depression. This second higher-order dimension could be interpreted as one reflecting the degree to which a person engages in inward- versus outward-focused thinking—thoughts of self-deprecation are inward-focused whereas thoughts of physical contamination, accidents, aggression, and using technology are relatively more focused on the external environment.

The third canonical dimension was composed of worry, psychopathy, and (log of) the frequency of suppressing thoughts related to sex, aggression, and addictive substances. Lower levels of worry (r = -.56) and higher levels of psychopathy (r = .76) in general were associated with more frequent suppression of thoughts related to sex (r = .51), aggression (r = .32), and addictive substances (r = .54) over the past month.

The combination of high levels of psychopathy and low levels of worry is consistent with the traditional characterization of psychopathy as lacking anxiety, fear, and related symptomatology (cf. Hare & Neumann, 2008), with worry being one of the predominant features of trait anxiety. The frequent suppression of thoughts related to addictive substances, sex, and aggression could be a reflection of the frequent experience

of such thoughts, which is reminiscent of the impulsive and thrill-seeking lifestyle of psychopaths as well as their antisocial tendencies. Thus, even though the construct of psychopathy has not primarily been defined in terms of particular thought contents, the current results suggest that subclinical psychopathy is characterized by the frequent suppression of thoughts related to social deviance (cf. Harpur, Hare, & Hakstian, 1989). Assuming that the structure of psychopathy is dimensionally distributed, the current results present an intriguing possibility that the frequent suppression of socially deviant thoughts over time could ironically result in an increase in the experience of such thoughts, which could then lead to a behavioral rebound (see Erskine, 2008; Wegner, Ansfield, & Pilloff, 1998) as well as greater psychopathic tendencies. This dimension therefore could be interpreted as one reflecting the degree to which a person exhibits psychopathic traits.

Interestingly, this third canonical dimension was the only dimension that exhibited sex differences. Males (M = 0.43, SD = 0.87) scored higher on the corresponding psychopathological indicator variate than did females (M = -0.45, SD = 0.93), $t(862) = -14.50$, $p < .001$, suggesting that males were more likely to report a lower tendency to worry and higher trait psychopathy. Males (M = 0.35, SD = 0.96) also scored higher on the corresponding thought category variate than did females (M = -0.35, SD = 0.91), $t(875) = -11.07$, $p < .001$, indicating that males were more likely to frequently suppress thoughts of sex, aggression, and addictive substances over the past month. This sex difference is in line with previous research showing that psychopathy and antisocial personality disorder tend to be more prevalent in males (see Cale & Lilienfeld, 2002).

Finally, the fourth canonical dimension was composed of (square-root of) obsessive-compulsive distress, psychopathy, and (log of) the frequency of suppressing thoughts related to physical contamination, eating and weight, and using technology. This dimension suggests that higher levels of obsessive-compulsive distress (r = .36) over the past month and lower levels of psychopathy (r = -.41) in general was associated with more frequent suppression of thoughts related to physical contamination (r = .34), eating and weight (r = .35), and using technology (r = .31) over the past month.

This fourth canonical dimension suggested that people reporting high levels of obsessive-compulsive distress in the past month and low levels of trait psychopathy were likely to suppress thoughts related to physical contamination, eating and weight, and using technology. The combination of high levels of obsessive-compulsive distress and low levels of trait psychopathy might be a reflection of a common correlate, namely, high levels of neuroticism. The interpretation of the relationship between this combination of psychopathological indicators and the set of frequently suppressed thoughts, although explainable to an extent, is not as clear as that for the other three canonical dimensions. There was, after all, only a 10% overlap in the variance of this pair of variates, and so less focus should be placed on the interpretation of this dimension.

Having demonstrated that the set of psychopathological indicators are associated with the frequency of suppressing the set of thought categories on at least three interpretable dimensions, the next section explores whether people can be grouped into distinct clusters based on their response patterns on the 69-item PETS scale. The thought suppression profiles and the subclinical psychopathological characteristics of each cluster were then examined.

Clusters of distinct thought suppression profiles. Cluster analysis is a technique used to classify cases (i.e., people) into discrete, homogenous subgroups. The total variance of each case is assigned to a specific underlying source (i.e., cluster). This is contrasted against factor analysis where the variance of a variable is partitioned among several factors. Cases within a cluster are similar to each other but different from cases in other clusters. The first step of cluster analysis is to calculate the similarity or proximity between each pair of cases using measures such as correlations or squared Euclidean distances. This results in a proximity matrix, which is subject to a clustering method to divide the total number of cases into distinct, homogeneous subgroups. Typically, a hierarchical clustering method is applied first to help define the number of clusters, and then *k*-means clustering is used to cross-validate the hierarchical clustering solution. The *k*-means method derived clusters are then interpreted by inspecting the mean scores of the components (i.e., thought category subscales), and finally, between-cluster differences (in psychopathology indicators) are assessed.

Establishing the number of clusters. Squared Euclidian distance was used as the similarity measure. To establish the initial clusters, the log-transformed subscale mean scores were subjected to Ward's (1963) hierarchical agglomerative clustering. This method is widely used in the behavioral sciences as it tends to provide results that are replicable and meaningful (Borgen & Barnett, 1987; Borgen & Weiss, 1971). This method begins with each person constituting a single cluster—in the present study, 888 clusters—and successively assigns people into a smaller number of clusters that have minimum within-group variation and maximum between-group variation. The clustering technique computes an agglomeration coefficient—an index of within-group error—at

each clustering step, which reflect how dissimilar the clusters currently being merged are. A large jump in coefficients between adjacent clustering steps therefore indicates that two dissimilar clusters are being combined. The number of clusters that best fit the data would therefore correspond to the step before the sudden jump occurs. Figure 9 shows the agglomeration coefficients for the last 20 clustering steps, which resembles a scree plot in factor analysis. Although the jump in the coefficients from three to two clusters is more apparent, the first sudden jump occurs when the number of clusters is reduced from five to four clusters. Thus, the five-cluster step was used as a stopping point.

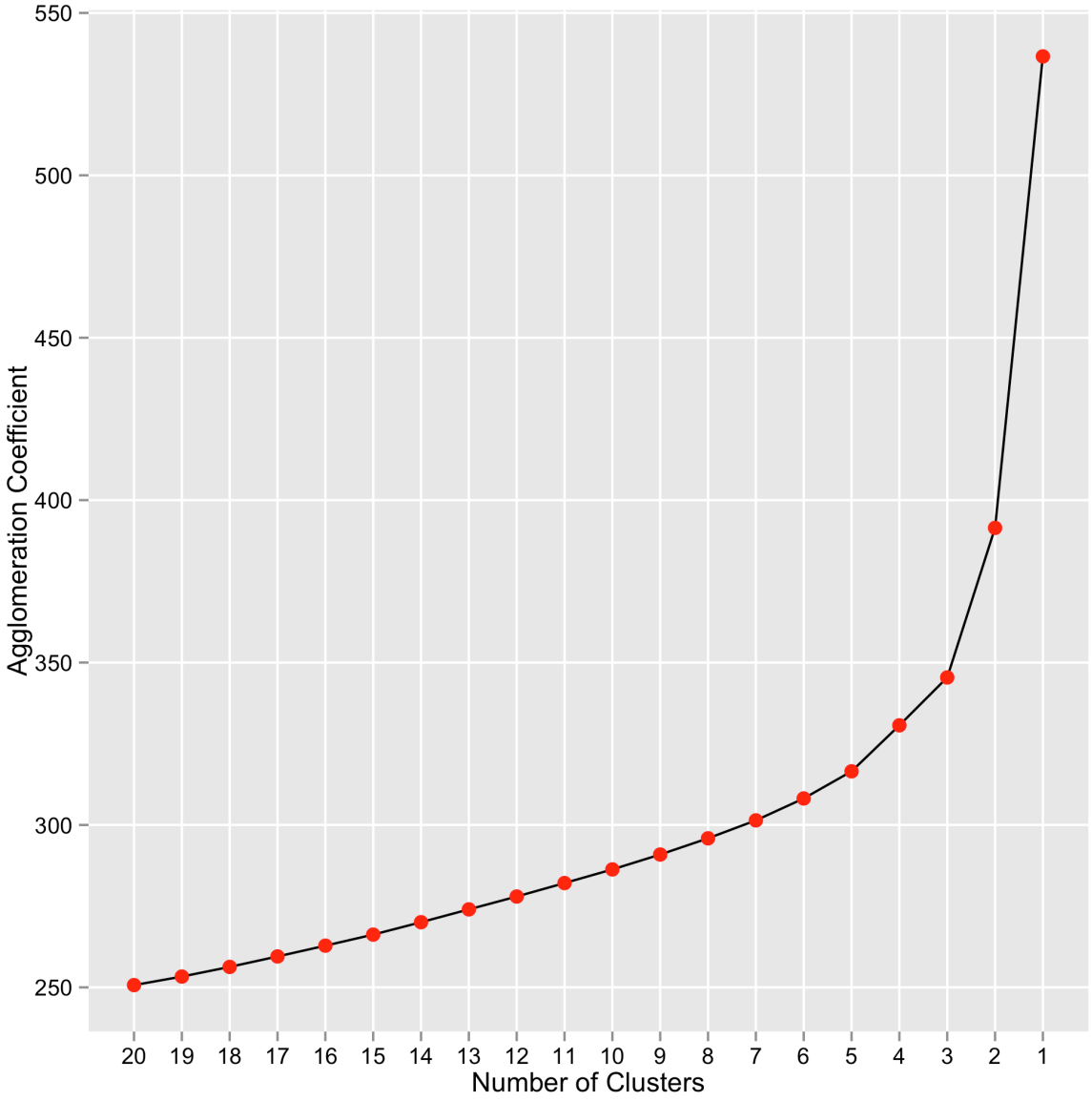


Figure 9. Agglomeration coefficients for the last 20 clustering steps using Ward's hierarchical method.

Forming the clusters. Ward's hierarchical clustering method is a noniterative process; once a person is assigned to a cluster, they remain in that cluster. As a result, this method is susceptible to random error in the data. Therefore, to cross-validate the hierarchical clustering solution, *k*-means clustering was used with the number of clusters (i.e., *k*) specified as five and the initial cluster centers (i.e., centroids) based on the hierarchical solution. Although the *k*-means clustering method begins with the centroids obtained from the hierarchical solution, it iteratively modifies them until the change between two iterations is negligible. Therefore, once a person is assigned to a cluster, they can be reassigned to another cluster in successive steps.

The agreement in cluster membership between Ward's clustering and *k*-means clustering methods was 71% and Cohen's kappa = .64, suggesting substantial agreement (Landis & Koch, 1977). The next section examines the profiles of thought suppression for each of the *k*-means method derived clusters.

Profiles of thought suppression. Figure 10 shows, for each cluster, the mean standardized log frequencies with which the thought categories are suppressed. Since the goal of cluster analysis is to form clusters that have minimum within-group variation and maximum between-group variation, it comes as no surprise that the five clusters significantly differed from each other in the overall frequency with which thoughts in general are suppressed, $F(4, 883) = 2{,}233.08$, $p < .001$. Cluster 1 ($n = 119$, $M = 1.15$, $SE = 0.02$) suppressed thoughts more frequently overall, followed by cluster 2 ($n = 162$, $M = 0.48$, $SE = 0.02$), cluster 3 ($n = 203$, $M = 0.11$, $SE = 0.01$), cluster 4 ($n = 215$, $M = -0.35$, $SE = 0.01$), and cluster 5 ($n = 189$, $M = -0.85$, $SE = 0.02$).

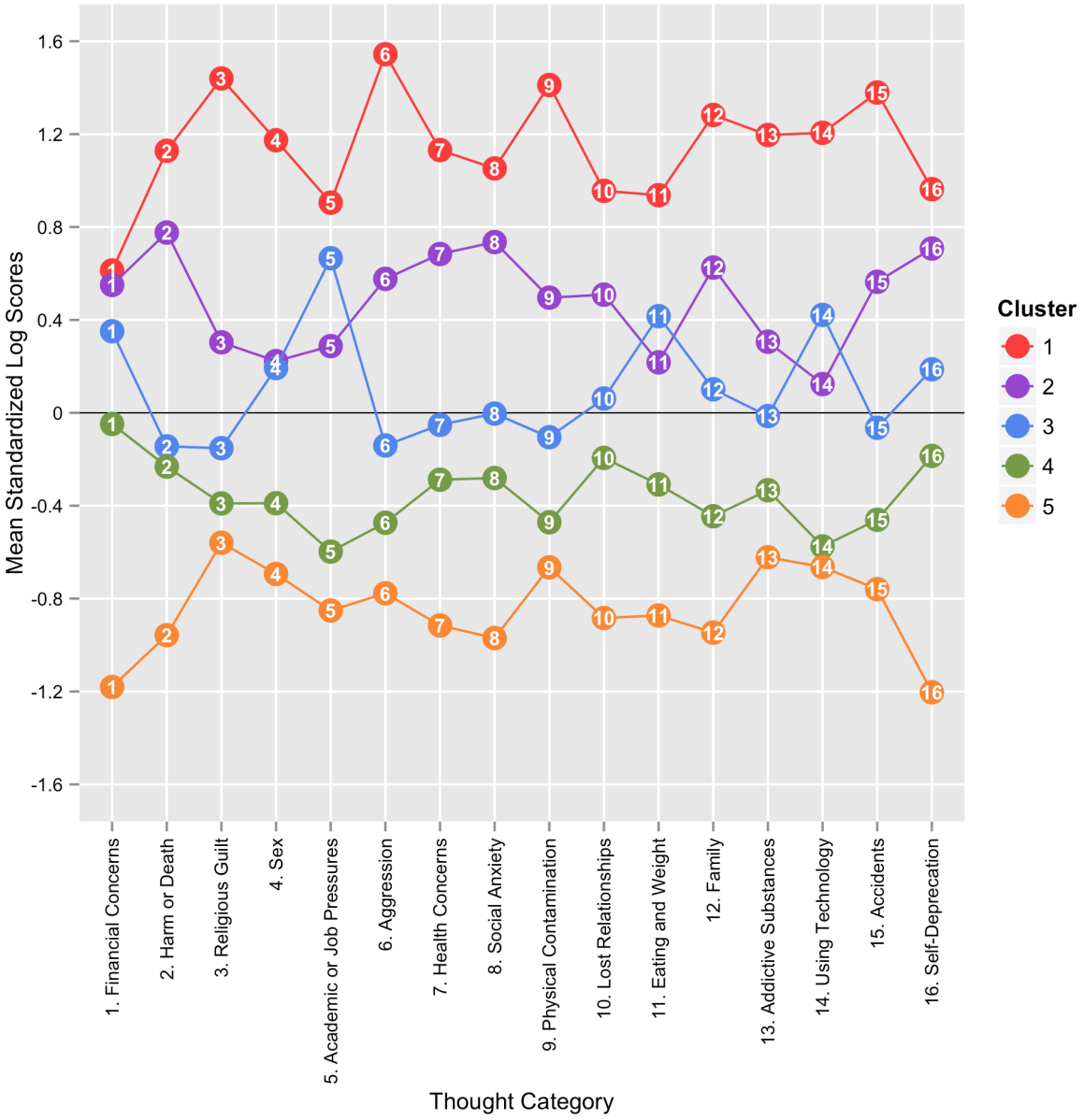


Figure 10. Profiles of thought suppression for each cluster.

For each cluster considered by itself, the suppression frequencies varied significantly across thought categories (i.e., profiles were nonflat), F range: 8.45–19.33, all $ps < .001$. To examine which thought categories were most frequently suppressed within each cluster, multiple t-tests with FDR corrections were conducted.

The set of thought categories that were most frequently suppressed (and that didn't differ from each other in suppression frequencies) for cluster 1 included thoughts related to religious guilt, aggression, physical contamination, and accidents. The set for cluster 2 included those related to harm or death, aggression, health concerns, social anxiety, family, and self-deprecation. For cluster 3, thoughts related to academic or job pressures were suppressed more often than all other thoughts. This was followed by thoughts related to financial concerns, eating and weight, and using technology, which did not differ from each other. For cluster 4, the most frequently suppressed set of thoughts included those related to financial concerns, lost relationships, and self-deprecation. Finally, for cluster 5, the most frequently suppressed set of thoughts included those related to religious guilt, physical contamination, addictive substances, and using technology.

Although the most frequently suppressed set of thought categories differed across clusters, there was some overlap in thought contents. The suppression profiles for clusters 1 and 5 demonstrated relative peaks for thoughts related to religious guilt, physical contamination, and accidents, which, based on the multiple regression and canonical correlation results, suggest that people in these clusters might score highly on obsessive-compulsive distress. In contrast, the suppression profiles for clusters 2 through 4 exhibited relative peaks for thoughts related to financial concerns and self-deprecation, suggesting that people in these cluster might score highly on worry and depression. The subclinical psychopathological characteristics of the clusters were examined next.

Subclinical psychopathological characteristics of clusters. From the canonical correlation analysis reported above, the first canonical dimension along which the set of

thought categories and the set of psychopathological indicators were related suggested that people who suppressed all thought categories frequently over the past month were likely to report higher levels of all forms of subclinical psychopathology in the past month. Given that the thought suppression profiles of the five clusters differed from each other in their overall mean suppression frequency scores, it could be that the five clusters similarly differed from each other in their overall level of subclinical psychopathology. In addition to differing in their overall mean scores, the profiles of thought suppression, to some degree, also reflected cognitive characteristics of people experiencing high levels of obsessive-compulsive distress (clusters 1 and 5) or high levels of depressive worry (cluster 2 through 4). People in clusters 1 and 5 are therefore more likely to report higher relative levels of obsessive-compulsive distress whereas people in clusters 2 through 4 are more likely to report higher relative levels of worry and depression.

A multivariate analysis of variance (MANOVA) was conducted with the five clusters as the grouping factor and the five psychopathological indicators as the dependent variables. Using Pillai's trace, the clusters significantly differed in their levels of the five psychopathological indicators, $V = 0.63$, $F(20, 3{,}528) = 32.69$, $p < .001$.

To find the linear combinations of the psychopathological indicators that best separate the clusters, the MANOVA was followed up with a discriminant analysis. The goal of this analysis is to predict cluster membership from the set of psychopathological indicators. Four discriminant functions were revealed. The first explained 92% of the between-cluster variance (canonical $R^2 = .54$) and the second explained 7% of the between-cluster variance (canonical $R^2 = .08$). The variance explained by the remaining two functions was effectively zero. In combination, all four functions significantly

discriminated the clusters, $\Lambda = .42$, $\chi^2(20) = 760.83$, $p < .001$. When the first function was removed, the remaining three functions also significantly discriminated the clusters, $\Lambda = .91$, $\chi^2(12) = 80.74$, $p < .001$. Removing the second function indicated that the remaining two functions did not significantly differentiate the clusters, $\Lambda = .995$, $\chi^2(6) = 4.42$, $p = .62$.

To interpret the discrimnant functions, the loadings of the psychopathological indicators on the discriminant functions were examined. Again, an absolute correlation ≥ .30 (9% overlapping variance) was used as a cutoff for determining whether a psychopathological indicator significantly contributed to a discriminant function (cf. Tabachnick & Fidell, 2007). For the first function, anxiety ($r = .80$), obsessive-compulsive distress ($r = .76$), depression ($r = .72$), and worry ($r = .52$) all had strong positive loadings. This function therefore resembled a higher-order "negative affect" dimension since higher scores on this first function were associated with higher levels of anxiety, obsessive-compulsive distress, depression, and worry. For the second function, worry ($r = .62$) and depression ($r = .48$) had high positive loadings. Although obsessive-compulsive distress ($r = -.29$) and anxiety ($r = -.17$) had negative loadings on this function, the strength of the associations was weaker. This function therefore appeared to reflect a "depressive worry" dimension since higher scores on this function were associated with higher levels of worry and depression.

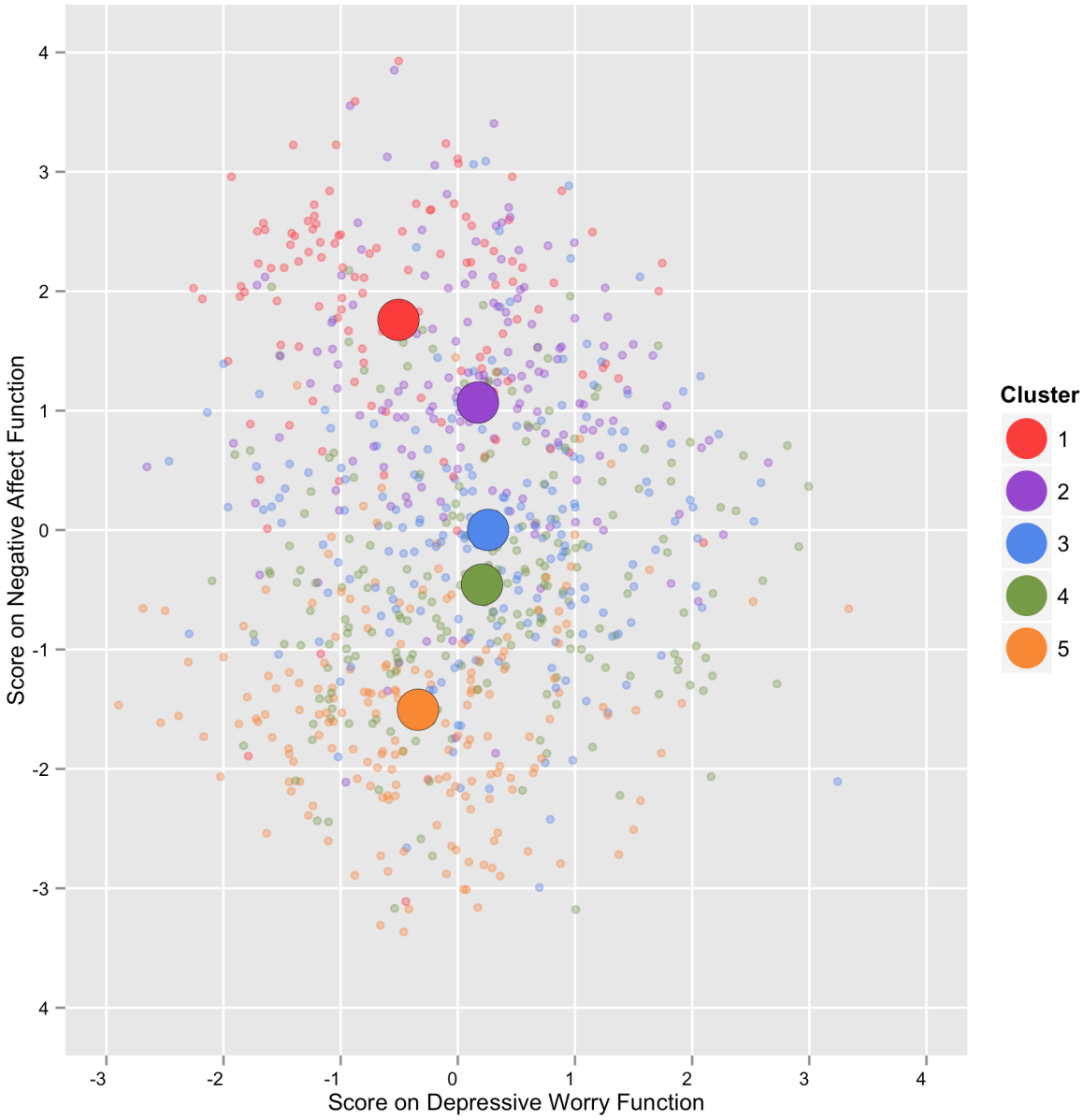


Figure 11. Individual and centroid scores on the negative affect function and the depressive worry function. The negative affect function is associated with high levels of anxiety, obsessive-compulsive distress, depression, and worry. The depressive worry function is associated with high levels of depression and worry and low levels of obsessive-compulsive distress and anxiety.

People's scores on these two discriminant functions and the cluster centroids are shown in Figure 11. The height of the cluster centroids along the negative affect discriminant function mirrors the height of the suppression profiles for the clusters in Figure 10. Cluster 1 scored the highest on this discriminant function followed by cluster 2, cluster 3, cluster 4, and then cluster 5. Similarly, cluster 1 had the highest suppression profile level, followed by cluster 2, cluster 3, cluster 4, and then cluster 5. The combined results therefore suggest that greater negative affect is associated with more frequent suppression of thoughts in general.

The depressive worry discriminant function separated clusters 1 and 5 from clusters 2, 3, and 4. Clusters 2 through 4 scored higher on this function than clusters 1 and 5, suggesting that people in clusters 2 through 4 reported higher relative levels of worry and depression than people in clusters 1 and 5. Taken together with the corresponding profiles of thought suppression, the results suggest that people reporting high levels of worry and depression are likely to suppress thoughts related to financial concerns and self-deprecation (cf. Diefenbach et al., 2001). Since higher scores on the depressive worry discriminant function were associated, albeit weakly, with lower relative levels of obsessive-compulsive distress, it suggests that people in clusters 1 and 5 (who had lower scores on this function) reported higher relative levels of obsessive-compulsive distress than people in clusters 2 through 4. This therefore corresponds to the relative peaks for thoughts related to religious guilt, physical contamination, and accidents in the suppression profiles of clusters 1 and 5.

In sum, the cluster analysis assigned people to five discrete clusters with each exhibiting a distinct thought suppression profile. The profiles differed in their relative

height (i.e., overall suppression frequency scores) and in their relative peaks (i.e., the set of thought categories that were most frequently suppressed). The overall suppression frequency for each cluster mapped onto the overall negative affect people reportedly experienced in the past month. Frequent thought suppression was therefore associated with greater negative affect. The relative peaks for each of the thought suppression profiles suggested that three profiles resembled that of people experiencing high levels of worry and depression whereas two profiles resembled that of people experiencing high levels of obsessive-compulsive distress. Results from the discriminant function analysis therefore demonstrated a match between relative levels of subclinical psychopathology and specific thought suppression profiles.

General Discussion

Among the rich variety of thoughts we experience in our daily lives, there seem to be certain thoughts we find especially troubling. But do people differ in the sets of thoughts they struggle with? Through a series of three main studies, the present research examined whether there was a specific relationship between the various forms of subclinical psychopathology and the types of thoughts people are likely to suppress. It was hypothesized that the set of thoughts a person often tries to push away would likely be those that they find intrusive, and that the particular set of thoughts a person finds intrusive would be associated with their predominant emotional state.

In previous research, the instruments used to measure individual differences in the tendency to suppress thoughts did not focus on the different types of thought contents people are likely to suppress. Instead, these instruments assessed whether people differ in their attempts at suppression in general. It is unclear, however, whether this tendency to suppress thoughts is equally generalizable across all thought topics. Therefore, Study 1 was concerned with the development of a scale that would assess both the types of thoughts people suppress as well as the frequencies with which each thought is suppressed. The 60-item PETS scale and its 14 subscales exhibited good internal consistency, test-retest reliability, and convergent as well as discriminant validity. Its 14-factor structure was also generalizable across samples. Importantly, the correlations among the factors ranged from weak to strong suggesting that the tendency to suppress thoughts is not consistent across all thought categories. Instead, there are meaningful distinctions to be made among the various thought contents people might choose to suppress, which bolsters the need for the development of the PETS scale.

Having identified the types of thoughts people try to suppress in everyday life, Study 2 examined whether the proportion of time with which a thought is suppressed was related to the frequency with which the thought is experienced. Are thoughts that are often experienced always subject to suppression attempts? Although results suggested that thoughts that are more often experienced were generally more likely to be suppressed for a greater proportion of the time, the strength of the association varied across thought categories. The associations were stronger for thought categories that were more often experienced as well as more negatively valenced (e.g., financial concerns). In contrast, the associations were weaker for thought categories that are not conclusively negative (e.g., using technology) or that might even be positive (e.g., sex).

The weaker correlations therefore demonstrate that thoughts that occur frequently—which are more likely to be perceived as repetitive and thus intrusive—are not necessarily suppressed whenever they occur. At the same time, thoughts that occur only once or twice have the potential to be suppressed for most of the time they occur. In other words, the frequency with which a thought is experienced does not inevitably determine its suppression fate. More importantly though, this variability in the correlation strengths across thought topics indicates that the various thought categories differ along one or more dimensions, which again justifies the need to distinguish among the various thought contents. Although it was suggested that the proportion of time with which a thought is suppressed might depend on both the frequency with which it is experienced as well as the degree to which it is negatively valenced, this speculation should be tested empirically. Future research could also examine whether there are other dimensions (e.g., social acceptability, degree to which the thought conflicts with goal

pursuit) along which the thought categories vary and how these dimensions might interact to influence people's decisions to suppress a thought.

The imperfect relationship between how often a thought is experienced and how often a thought is suppressed has at least one other notable implication: it reassuringly suggests that when people complete the PETS scale to indicate how often they suppress each thought, they are not simply indicating how often they experience each thought. When the frequencies with which the thought categories are reportedly suppressed (i.e., PETS scale ratings) were compared with the frequencies with which the thought categories are reportedly experienced, the trends were similar but not identical. The overall similarity in trends makes intuitive sense since thoughts that occur often have a higher likelihood of being suppressed. The local differences between the trends, though, demonstrate that the PETS scale does not simply measure the frequencies with which thoughts are experienced. This therefore attests to the validity of the PETS scale.

What is gained from knowing how often a thought is suppressed instead of simply asking how often a thought is experienced? The key difference lies in whether a person deems that a thought needs to be controlled. The frequency with which a thought is experienced serves as a maximum limit for the frequency with which a thought is suppressed. After all, a thought can only be suppressed if it is first experienced. As discussed, there are likely multiple determinants influencing people's decision to suppress a thought. More broadly, these determinants as a whole influence the degree to which a thought is perceived to be unwanted and thus needs to be controlled. The frequency with which a thought is suppressed therefore reflects the degree to which a thought is perceived to be unwanted.

The utility of the PETS scale can be more concretely illustrated through the consideration of two scenarios. Given a list of thoughts, a person might experience all thoughts and also suppress all thoughts with the same frequency. One interpretation of this extreme is that the person judges all thoughts to be unwanted and therefore feels the need to push away each and every one of the listed thoughts whenever they occur. A more likely circumstance, though, is that a person experiences all thoughts but judges only a subset to be unwanted and so suppresses only those specific thoughts. This scenario exemplifies one of the main functions of the PETS scale: it identifies the thoughts a person finds troubling. In other words, the PETS scale highlights the problem areas, which could potentially help inform treatment designs. For instance, if a clinician were to use suppression demonstrations as a means to educate patients about the futility of thought suppression (e.g., Najmi et al., 2009; Wilhelm & Steketee, 2006), the PETS scale could be used to pinpoint the specific thoughts a patient thinks should be controlled and used to help the clinician understand how these thoughts should be ranked in terms of how troubling they are for the patient. This information might then help the clinician decide how (and in what order) to target these specific thoughts.

The discussion so far indicates that there are at least three functions of the PETS scale: it gives a broad overview of how often a person attempts suppression; it identifies the thoughts a person finds troubling; and it suggests how these troubling thoughts should be ranked. For the latter, a profile plot of a person's PETS scale responses provides a convenient visual summary of the relative frequencies with which the thoughts are suppressed. Although each person is likely to present a unique suppression profile, certain people might share more similar profiles than with others. What underlying

differences might account for the homogeneity in suppression profiles within a group and heterogeneity in suppression profiles among groups? Since the suppression of a thought is contingent on first having experienced the thought, the present research used the cognitive content-specificity hypothesis as a theoretical basis for identifying these individual differences. In particular, Study 3 looked at the relationship between the suppression frequencies of 16 thought categories and levels of subclinical depression, anxiety, worry, obsessive-compulsive distress, and psychopathy. One implication of finding a specific relationship between the various forms of subclinical psychopathology and the types of thoughts that are often suppressed is that the PETS scale serves yet another function: the suppression profile resulting from a person's PETS scale responses provides information about how the person might score on these various forms of subclinical psychopathology. The pattern of PETS scale responses therefore affords the prediction of a person's predominant subclinical psychopathological state.

At the broadest level, results from Study 3 suggested that higher scores on depression, anxiety, worry, and obsessive-compulsive distress were associated with more frequent suppression attempts. These positive associations held even after controlling for the tendency to respond in a socially desirable manner. For psychopathy, however, the positive associations were generally weaker. The weaker associations are in line with previous research showing that people with higher psychopathic tendencies report fewer intrusions, perhaps because they are less likely to perceive intrusive thoughts as "intrusive" (O'Neill et al., 2009). Fewer (perceived) intrusions translate to fewer suppression attempts, and so people with higher psychopathic tendencies were expected

suppress thoughts less often in general. The weaker correlations could therefore be a consequence of the restricted range in the frequency of suppressing thoughts.

These results taken together also suggest that the constructs of depression, anxiety and worry, and obsessive-compulsive distress are more similar to each other than they are to the construct of psychopathy. Indeed, to explain the high rates of comorbidity between unipolar depression and the heterogeneous set of anxiety disorders, some researchers have suggested that depression and the various anxiety disorders are related to a single underlying dimension—a general negative affect factor—and might all be better conceptualized as belonging to a general class of mood disorders as opposed to being distinct clinical entities (cf. Mineka, Watson, & Clark, 1998). With respect to the present research, the constructs of depression, anxiety and worry, and obsessive-compulsive distress can all be classified as belonging to a general class of mood disorders that were all strongly related to the frequency of suppressing thoughts. These mood disorders were contrasted with the construct of psychopathy, putatively regarded as a personality disorder, which was less related to the frequency of suppressing thoughts. This finding therefore provided support for the discriminant validity of the PETS scale.

In examining the unique contribution of each indicator to predicting the suppression frequencies of the various thoughts, specific patterns were revealed. Generally, a given psychopathological indicator played a more important role in predicting the suppression frequencies of thought contents characteristic of the corresponding emotional state. This served as the first hint of a specific relationship between the various forms of subclinical psychopathology and the types of thoughts that are often suppressed.

Levels of depression, for instance, were more heavily weighted predictors for thoughts related to personal failures (i.e., self-deprecation) and losses in interpersonal domains (i.e., lost relationships, family). In contrast, the global measure of anxiety played a large role in predicting the frequency of suppressing thoughts related to potential threat or harm (i.e., accidents, health concerns) and social anxiety. In addition, this global measure of anxiety strongly predicted the frequency of suppressing thoughts related to aggression and addictive substances, both of which have been associated with social anxiety (see Comeau et al., 2001; Kashdan & McKnight, 2010). Except for thoughts related to financial concerns, the tendency to worry was not a particularly strong predictor of the suppression frequencies of any of the thought categories, perhaps because of the overlap in variance between the global measure of anxiety and the specific measure of worry. As expected, degree of obsessive-compulsive distress was a strong predictor of all thought categories, but was more strongly associated with thoughts related to physical contamination, accidents, and sex—intrusive thoughts that nonclinical individuals consider to be the most upsetting and frequent (Berry & Laskey, 2012). Again, compared to levels of depression, anxiety, worry, and obsessive-compulsive distress, degree of trait psychopathy did not uniquely contribute as much to predicting the frequency with which the various thought categories were suppressed.

These findings repeated themselves albeit in different forms in the canonical correlation analysis, cluster analysis, and discriminant analysis. Across these analyses, a higher-order negative affect factor accounted for most of the initial variance, which showed that people experiencing more subclinical symptoms of psychopathology reported more frequent thought suppression in general. The frequency of thought

suppression was more strongly associated with the mood disorders than with psychopathy, suggesting that this higher-order negative affect factor represents a general vulnerability to various mood disorders and negative cognitions. Of particular significance for the present research, the residual variance showed that profiles of subclinical psychopathology were differentially associated with distinct thought suppression profiles.

The results from the discriminant analysis showed that the five distinct suppression profile clusters could only be separated along two discriminant functions—a negative affect function and a depressive worry function—as opposed to five discriminant functions each representing the five psychopathological indicators. This could be attributed to the mood disorders being highly associated with each other. Specifically, the negative affect function might reflect a general vulnerability factor for various mood disorders. In contrast, psychopathy did not constitute a significant part of this function, which makes sense given that psychopathy is conceptualized as a personality disorder and not a mood disorder. The depressive worry function, although named so, represented a latent factor that positively affects depressive worry but negatively affects obsessive-compulsive distress. That is, higher scores on this function reflected higher relative levels of depressive worry whereas lower scores reflected higher relative levels of obsessive-compulsive distress. This function discriminated the five clusters into two groups, and therefore provided further indication that levels of subclinical psychopathology are differentially associated with specific thought suppression profiles.

Interestingly, the third dimension of the canonical correlation analysis suggested that subclinical psychopathy might be characterized by the frequent suppression of thoughts associated with social deviance. This is reflective of Factor 2 of the Psychopathy Checklist-Revised (PCL-R; Hare, 2003), which describes behaviors indicative of a chronically unstable and antisocial lifestyle (Harpur et al., 1989). Although the construct of psychopathy has not classically been defined in terms of idiosyncratic cognitive contents, the present results are suggestive of a specific set of psychopathic cognitions.

One possibility is that people with psychopathic tendencies frequently experience thoughts associated with social deviance but because subclinical psychopaths are able to evaluate the appropriateness of their goals, behaviors, and responses, they are likely to judge that socially deviant thoughts should be controlled and therefore suppressed. That is, subclinical psychopaths do not exhibit an information-processing deficiency unlike clinical psychopaths. Frequent suppression of socially deviant thoughts over time, however, could result in a paradoxical increase in the experience of such thoughts, which could lead to the actual engagement in antisocial behaviors and the development of an erratic lifestyle. Repeated exposure to antisocial acts could then desensitize the individual's negative emotional responses to such deviant behaviors (Anderson et al., 2003), leading to the development of callous affect, other psychopathic traits, and ultimately, a diagnosis of clinical psychopathy.

Despite the mounting evidence for the dimensional structure of psychopathy (e.g., Guay, Ruscio, Knight, & Hare, 2007), some researchers have suggested that psychopathy could still possess both dimensional and taxonic features (Ruscio, 2007). Subclinical

psychopathy could be distributed dimensionally but extreme (i.e., clinical) variants of psychopathy could qualitatively differ on multiple dimensions and therefore form a distinct taxon. Future research could examine whether subclinical and clinical psychopaths vary along a continuum in the degree to which they exhibit information-processing deficiencies and also whether clinical psychopaths exhibit a qualitatively distinct suppression profile from subclinical psychopaths. Results would shed further light on the structure of psychopathy.

Taken together, results from Study 3 provided support for a specific relationship between the various forms of subclinical psychopathology and the types of thoughts that are often suppressed. Importantly, the relative peaks of the distinct suppression profiles seemed to be indicative of a person's predominant subclinical psychopathological state. One potential application of this finding is prototypal matching. Given a person's thought suppression profile, the researcher or clinician could examine the profile in a hierarchical manner. First, the overall profile height would provide a quick summary of the person's overall experience of negative affect. Next, the relative peaks within the profile would be indicative of the particular thoughts the person finds troubling. These specific thoughts might then be compared with the prototypical peaks exhibited by the various forms of (subclinical) psychopathologies to get an idea of the person's predominant (subclinical) psychopathological state. Peaks for thoughts associated with religious guilt, physical contamination, and accidents, for instance, are suggestive of high relative levels of obsessive-compulsive distress. In contrast, peaks for thoughts associated with financial concerns and self-deprecation likely represent a person experiencing high relative levels of depression. Having identified these idiosyncratic

peaks, the researcher or clinician might then proceed to target these specific problematic thoughts. The reliability of these peaks being characteristic of specific psychopathological states, nevertheless, awaits further research.

Limitations and Future Directions

Several limitations of the present research provide directions for future research. Issues regarding the replicability of the cluster analytic solution, the correlational nature of the results, and the generalizability of the results to clinical populations are discussed in turn.

Although the specific subclinical psychopathological characteristics of the clusters provided support for the validity of the cluster analytic solution, more evidence is still needed. Cluster analytic methods will more often than not generate a solution regardless of the nature of the data set; even feeding in a set of random numbers will likely result in a cluster solution. Other than examining characteristics of the clusters and replicating results across different cluster analytic methods—both of which were carried out in the present research—the validity of the cluster analytic solution should also be established through replicating results across parallel data sets and across different variables (cf. Blashfield, 1980). In addition, the utility of the resultant solution should be assessed through future studies examining the predictive validity of the clusters with respect to differential treatment outcomes, which would have implications for designing treatments tailored to the specific thoughts that are particularly troublesome for the patient (cf. Skinner & Blashfield, 1982). The converging results across multiple analytic strategies, nevertheless, do give confidence to the main finding that the various forms of

subclinical psychopathology are related in specific ways to the types of thoughts that are often suppressed.

Since the correlational nature of the results precludes any causal claims, the present findings do not speak to whether higher levels of subclinical psychopathology prompt more frequent suppression attempts, vice versa, or both. People are likely to use thought suppression as a coping technique in response to the intrusive thoughts concomitant with particular psychopathological states (Najmi & Wegner, 2009; Wegner & Pennebaker, 1993) but it is also possible for the frequent suppression of repetitive, unwanted thoughts to ironically escalate into, maintain, or exacerbate symptoms of psychopathology (Najmi & Wegner, 2008; Wenzlaff, 2005; Wenzlaff & Wegner, 2000). The present findings are nonetheless in line with the notion that thought suppression represents a broad cognitive risk factor for psychopathological symptoms.

Although the present research attempted to sample from a demographically diverse pool, the generalizability of the results to clinical populations rests on the assumption that the various psychopathologies assessed are dimensionally distributed. It is unclear, however, whether each of the psychopathologies are best conceptualized as distributed along dimensions or distributed as taxa. It could be that subclinical variants are dimensionally distributed whereas clinical variants form a qualitatively distinct group (Ruscio, 2007). That is, within a subclinical group, people might reliably vary along one or more dimensions that purportedly measure the subclinical construct but at extreme levels, people might substantially differ along several dimensions so as to warrant a distinct taxon. One avenue for future research, then, is to examine whether individuals clinically diagnosed with depression, anxiety, OCD, and psychopathy differ substantially

in their suppression profiles from their subclinical counterparts. The definition of a "substantial" difference might depend on whether the same relative peaks that were suggested to be characteristic of each subclinical psychopathology in the present research are also found in the profiles of those who are clinically diagnosed.

Conclusion

For each of us, there appears to be an idiosyncratic set of thoughts we often struggle to push out of our minds. Those who have a chronic tendency to worry suppress thoughts of their thinning wallet, those who are socially anxious try not to think about their social blunders, those prone to obsessive-compulsive distress often resist thoughts of something terrible happening to their loved ones, and those prone to depression try to push away thoughts of failing in life. The current findings demonstrate a specific mapping between psychopathological states and the types of thought contents people are likely to suppress, which presents a step forward in the literature on individual differences in thought suppression.

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Appendix A

Items Included in the 107-Item PETS Scale

1. Academic or Job Pressures
   - Being unemployed
   - Work deadlines
   - The amount of things I have to get done for work or for school
   - Difficulties at work or at school
   - Not liking my job or school
   - Failing at my job or school
   - Not being able to achieve my career goals
   - Stress from work or school
2. Financial Concerns
   - Not having enough money
   - Being in debt
   - Bills I have to pay
   - My depleting bank account
   - Running out of money
   - How little cash I have
   - How much I have spent
   - Having to spend money on things I can't afford
   - Losing my savings
   - Not being able to buy things I want
   - Not having enough health insurance
3. Harm or Death
   - My family getting sick
   - Something bad happening to a loved one
   - My own death
   - The death of a loved one
   - The possible death of a loved one
   - The death of a close friend
   - The time I have left to live
   - The afterlife
   - Ending my life
   - Leaving my loved ones when I die
4. Lost Relationships
   - Relationships I no longer have
   - My ex-boyfriend or ex-girlfriend
   - My partner cheating on me or leaving me
5. Relationship Difficulties
   - Not being able to trust people
   - Relationship difficulties with work colleagues or classmates
   - Hurtful things someone said or did
   - Irritating things someone said or did
   - Relationship difficulties within my family
   - Relationship difficulties with friends
6. Loved Ones
   - My mother
   - My father
   - Romantic feelings I have for someone
   - Being far away from those I care about
7. Health Concerns, Old Age
   - My health problems
   - An illness I might have
   - Going to the doctor
   - Developing a genetic illness
   - How much pain my body is in
   - Getting older
   - Who will take care of me when I'm old and infirm
8. Personal Image, Weight
   - Exercising to stay healthy
   - People judging me
   - Not looking good enough
   - Comparing myself with others
   - Eating snacks
   - Unhealthy foods I've eaten

9. Aggression, Hurting or Harming Others
    - How angry I am
    - Hitting others
    - Smashing things
    - Shouting obscenities
    - Things I've said or done to hurt someone
    - Doing harmful things to others
    - Saying hurtful things to others
    - Being responsible for other's suffering
10. Anxious Cognitions, Worry, Panic Sensations, Social Anxiety
    - How anxious I am
    - Uncertainties about the future
    - Not having a secure future
    - Strange or uncomfortable bodily sensations
    - Feeling nervous around others
11. Physical Contamination
    - Getting diseases from others
    - Spreading diseases to others
    - Images of spiders or cockroaches
12. Accidents
    - Getting into a car accident
    - Leaving the gas stove on
    - Someone breaking into my house
13. Sexual Thoughts
    - Being sexually attracted to someone
    - Masturbating
    - Performing sexual acts with someone
    - Sexual images of others
    - Nude images of others
14. Addictions
    - Smoking a cigarette
    - Drinking an alcoholic beverage
    - Smoking marijuana
15. Religious Guilt and Doubt
    - Sexual images of religious figures
    - God watching my every move
    - God judging me
    - Going to hell
    - Being punished for sinning
    - God knowing that I've done something wrong
    - God being angry with me
    - The Devil watching my every move
    - Evil spirits following me
    - Questioning God's existence
    - Questioning my belief in God
16. Depressive Cognitions, Self-Deprecation
    - How depressed I am
    - Being alone
    - Not having many friends
    - Grief for a loved ones
    - Not being good enough at what I do
    - Not knowing what I want to do with my life
    - How I'm wasting my life away
    - Being disappointed in myself
    - The lack of purpose in my life
    - Not living up to people's expectations
17. Miscellaneous
    - Accidentally revealing a secret
    - How envious I am of other's good fortune
    - Chores I need to do around the house
    - Checking my e-mail

Appendix B

Primary Factor Loadings of the 107-Item PETS Scale

Thought Category	Items	Primary Factor Loading
Financial Concerns	Running out of money	.83
	How little cash I have	.81
	My depleting bank account	.81
	Not having enough money	.80
	Having to spend money on things I can't afford	.78
	Bills I have to pay	.75
	Being in debt	.75
	Not being able to buy things I want	.68
	How much I have spent	.64
	Not having a secure future†	.57
	Losing my savings	.54
	Being unemployed†	.46
	Not having enough health insurance coverage†	.41
Self-Deprecation	How I'm wasting my life away†	.73
	The lack of purpose in my life†	.71
	Not knowing what I want to do with my life	.69
	Being disappointed in myself†	.65
	Not being good enough at what I do	.58
	Not being able to achieve my career goals†	.57
	Not living up to people's expectations†	.52
	Uncertainties about the future†	.52
	How depressed I am†	.51
	Being alone	.49
	Failing at my job or school†	.48
	Not having many friends	.44
	Ending my life†	.39
	Not being able to trust people	.37
Harm or Death	The possible death of a loved one	.76
	Something bad happening to a loved one	.74
	The death of a loved one	.73
	My family getting sick	.65
	Grief for a loved one	.64
	Leaving my loved ones when I die	.63
	The death of a close friend	.63
	My own death†	.56
	The time I have left to live†	.51
	Someone breaking into my house†	.48
	Getting into a car accident†	.46
	Being far away from those I care about	.43
	Who will take care of me when I'm old and infirm†	.40
	Developing a genetic illness†	.37

Thought Category	Items	Primary Factor Loading
Religious Guilt	God judging me	.85
	God knowing that I've done something wrong	.82
	God being angry with me	.82
	God watching my every move	.81
	Being punished for sinning	.77
	Going to hell	.71
	Questioning my belief in God†	.54
	The Devil watching my every move†	.58
Sex	Being sexually attracted to someone	.78
	Nude images of others	.77
	Performing sexual acts with someone	.76
	Sexual images of others	.76
	Masturbating	.67
Academic or Job Pressures	Difficulties at work or at school	.71
	The amount of things I have to get done for work or for school	.68
	Work deadlines	.65
	Stress from work or school	.65
	Not liking my job or school†	.57
	Relationship difficulties with work colleagues or classmates†	.46
Aggression	Hitting others	.70
	Smashing things	.68
	Doing harmful things to others	.61
	How angry I am	.57
	Shouting obscenities	.44
	Irritating things someone said or did†	.41
Health Concerns	My health problems	.73
	An illness I might have	.65
	How much pain my body is in	.58
	Going to the doctor	.57
	Strange or uncomfortable bodily sensations†	.37
Social Anxiety	Feeling nervous around others	.60
	People judging me	.56
	Comparing myself with others†	.50
	How anxious I am†	.47
	Not looking good enough†	.44
Moral or Physical Contamination	Sexual images of religious figures†	.62
	Evil spirits following me†	.56
	Spreading diseases to others	.52
	Images of spiders or cockroaches	.38

Thought Category	Items	Primary Factor Loading
Hurting or Harming Others	Things I've said or done to hurt someone	.69
	Saying hurtful things to others	.59
	Being responsible for others suffering†	.56
	Hurtful things someone said or did	.51
Lost Relationships	My ex-boyfriend or ex-girlfriend	.77
	Relationships I no longer have	.70
	My partner cheating on me or leaving me	.47
Eating and Weight	Eating snacks	.72
	Unhealthy foods I've eaten	.71
	Exercising to stay healthy	.48
Family	My father	.72
	My mother	.71
	Relationship difficulties within my family	.39
Addictive Substances	Smoking a cigarette	.76
	Drinking an alcoholic beverage	.54
	Smoking marijuana†	.48

Note. Only items with primary loadings > .35 are listed.

† Items had cross-loadings > .30

Appendix C

Items Included in the 78-Item PETS Scale

1. Financial Concerns
   - Running out of money
   - How little cash I have
   - My depleting bank account
   - Not having enough money
   - Having to spend money on things I can't afford
2. Self-Deprecation
   - Not knowing what I want to do with my life
   - Not being good enough at what I do
   - Being a failure
   - The lack of purpose in my life
   - How I'm wasting my life away
3. Harm or Death
   - The possible death of a loved one
   - Something bad happening to a loved one
   - The death of a loved one
   - My family getting sick
   - Dying
4. Religious Guilt
   - God judging me
   - God knowing that I've done something wrong
   - God being angry with me
   - Going to hell
   - Being punished for sinning
5. Sex
   - Being sexually attracted to someone
   - Nude images of others
   - Performing sexual acts with someone
   - Masturbating
   - Viewing porn
6. Academic or Job Pressures
   - Difficulties at work or at school
   - The amount of things I have to get done for work or for school
   - Work or school deadlines
   - Stress from work or school
   - Wanting to leave my job or school
7. Aggression
   - Hitting someone
   - Smashing things
   - Doing harmful things to others
   - How angry I am
   - Cursing or shouting obscenities
8. Health Concerns
   - My health problems
   - An illness I might have
   - How much pain my body is in
   - Going to the doctor
   - An illness I might develop
9. Social Anxiety
   - Feeling nervous around others
   - Uncomfortable social situations
   - Having a panic attack in public
   - People talking about me behind my back
   - Doing or saying something embarrassing in front of others
10. Physical Contamination
    - Images of insects (i.e., spiders, cockroaches, centipedes, worms, bedbugs)
    - Dirt or germs on things
    - Diseases such as AIDS, sexually transmitted infections, hepatitis
    - Gory or bloody images
    - Bodily wastes (e.g., secretions, urine, feces, saliva, blood)

11. Hurting or Harming Others
    - Things I've said or done to hurt someone
    - Hurtful things someone said or did
    - Saying hurtful things to others
    - The negative effects my actions or words have on others
    - Being responsible for someone else's distress
12. Lost Relationships
    - My ex-boyfriend or ex-girlfriend
    - Relationships I no longer have
    - My partner cheating on me or leaving me
    - Cheating on or leaving my partner
    - Relationships that have gone sour
13. Eating and Weight
    - Eating snacks
    - Unhealthy foods I've eaten
    - Exercising to keep fit
    - The amount of calories I eat
    - My weight
14. Family
    - My father
    - My mother
    - My brother or sister
    - Relationship problems with family members or relatives
15. Addictive Substances
    - Smoking a cigarette
    - Drinking an alcoholic beverage
    - Smoking marijuana
    - Using illegal or illicit drugs
    - Checking my e-mail
16. Using Technology
    - Checking social networking sites (i.e., Facebook, Twitter)
    - Using the Internet
    - Checking my phone
    - Using my computer

Appendix D

Additional Items Included in Study 3

1. Accidents
   - Leaving the gas stove on
   - Getting into a car accident
   - Losing my possessions in a fire or flood
   - Leaving home door unlocked
2. Self-Deprecation
   - The lack of purpose in my life
   - Being disappointed in myself
   - How worthless I am
   - Not knowing what I want to do with my life
   - How I'm wasting my life away

Appendix E

Consistency of 60-Item PETS Scale Means and Subscale Means Across Studies

Scale or Subscale	Study 1b Versus Study 3	Study 1c Versus Study 3
Total PETS Scale	.97	.97
Financial Concerns	.99	.99
Harm or Death	.94	.98
Religious Guilt	.99	.87
Sex	.99	.96
Academic or Job Pressures	.95	.95
Aggression	.99	.99
Health Concerns	.85	.93
Social Anxiety	.99	.82
Physical Contamination	.78	.99
Lost Relationships	.99	.99
Eating and Weight	.97	.94
Family	.99	.97
Addictive Substances	.91	.99
Using Technology	.95	.97

Note. Values represent correlation coefficients between the thought-item means for each subscale from Study 3 and those from Study 1b and Study 1c. Sample sizes for Study 1b, Study 1c, and Study 3 are 765, 733, and 888, respectively. An explicit time frame (i.e., in the past month) was specified only for Study 3.